ECONOMIC AND DEMOGRAPHIC FUTURES IN EDUCATION

ALBERTA
1970
2005

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PROFESSOR OF ECONOMICS
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TABLE OF CONTENTS

Page
FOREWORD v
PREFACE vi
LIST OF TABLES vii
LIST OF FIGURES xi

SUMMARY

ALBERTA AND HER PEOPLE, 1970 TO 2005

Age Groups 1
Regional Distribution of the Population 1
Provincial Enrolment in Educational Institutions 2
  Potential Kindergarten and Pre-School Enrolment 3
  University Enrolment 3
  Post-Secondary Non-University Education 4
Personal Income in Alberta, 1980 and 2005 5
The Determinants of Economic Growth in Alberta 6
Provincial Government Revenues, 1980 6
Allocation of Provincial Government Revenues, 1980 7
The Cost of Education 8
  Total Costs of Education, 1980-81 9
  Educational Costs, Personal Income, and Provincial Government Revenues, 2005 10

CHAPTER 1

ALBERTA'S POPULATION, 1980 TO 2005

Population Totals, 1980 and 2005 12
Age Distribution of Provincial Population 18
Sex Distribution of Provincial Population 18
Rural to Urban Migration in Alberta 19
The Increasing Dominance of Edmonton and Calgary 19
Alberta's Geographic Regions 19
  The Southern Region 22
  The Central Region 22
  The Northern Region 22
  The Mountain Region 24
  The Edmonton Region 24
  The Calgary Region 26
Religious Characteristics of Alberta's Population 26
Regional Concentration of Selected Ethnic Groups 26
Tables 27

TABLE OF CONTENTS

CHAPTER II

ENROLMENT LEVELS — PAST, PRESENT, AND FUTURE

Primary and Secondary School Enrolment 41
  Enrolment Characteristics, 1950 to 1970 41
  Projected Enrolment, 1970 to 2005 43
Pre-School and Kindergarten Enrolment 47
University Enrolment 47
  Historic Growth 47
  Projected Enrolment, 1980 and 2005 49
Post-Secondary Non-University Enrolment 52
  Enrolment to 1969-70 52
  Projected Full-Time Enrolment 53
  Part-Time Post-Secondary Non-University Enrolment 54
Education for Non-Modal Groups 54
  Exceptional Children 54
Economic and Social Obstacles to Secondary and Post-Secondary Education 55
Distribution of Taxable Income in Alberta, 1967 55
Economic and Social Determinants of Educational Opportunity 56
Primary and Secondary Schools in Rural Areas 57
Tables 59

CHAPTER III

PROSPECTS FOR GROWTH IN THE PROVINCIAL ECONOMY

Product and Income Characteristics 70
  Canadian Gross National Product 70
  Canadian Personal Income 70
  Alberta Gross Provincial Product 70
  Gross Provincial Product Per Capita 71
  Alberta Personal Income 71
  Personal Income Per Capita 72
Industrial Characteristics 72
  Primary and Secondary Industries in Alberta 72
Technology, Growth, and the Provincial Resource Base 73
  The Petroleum Resource Base 74
  The Natural Gas Resource Base 75
  Coal and Technology 75
  Renewable Resources 76
  Technology, Growth, Capital Flows, and Foreign Ownership 77
The Alberta Labor Force: Level and Composition 78
Tables 82

TABLE OF CONTENTS

CHAPTER IV

EDUCATIONAL COSTS AND GOVERNMENT REVENUE IN ALBERTA, 1980 AND 2005

Potential Costs of Education 93
  Primary and Secondary Schools 93
  Primary and Secondary Costs with Kindergarten and Pre-School Education 94
  University Cost Projections 95
    Operating Costs, 1980 96
    Capital Costs, 1980 96
    Total University Costs, 1980 98
    Operating Costs, 2005, at 3 Per Cent 99
    Capital Costs, 2005, at 3 Per Cent 99
    Total Costs, 2005, at 3 Per Cent 100
    Operating Costs, 2005, at 5 Per Cent 100
    Capital Costs, 2005, at 5 Per Cent 101
    Total Costs, 2005, at 5 Per Cent 101
  Non-University Post-Secondary Cost Projections 102
    Operating Costs, 1980 102
    Capital Costs, 1980 103
    Total Costs, 1980 103
    Operating Costs, 2005, at 3 Per Cent 104
    Capital Costs, 2005, at 3 Per Cent 104
    Total Costs, 2005, at 3 Per Cent 105
    Operating Costs, 2005, at 5 Per Cent 105
    Capital Costs, 2005, at 5 Per Cent 106
    Total Costs, 2005, at 5 Per Cent 106
  Educational Costs in Relation to Personal Income 106
    Educational Costs and Personal Income in 1980 107
    Educational Costs and Personal Income in 2005 107
Provincial Government Revenues 108
  Revenue Sources in 2005 110
The Vulnerability of Long-Term Projections 112
Systems Analysis of Public Spending — the Planning, Programming, Budgeting System 112
Tables 114

CHAPTER V

SOME BASIC ISSUES OF EDUCATIONAL POLICY

Population Change and Educational Policy 119
Enrolment Levels and Educational Policy 119
Economic Growth and Educational Policy 120
Cost and Revenue Constraints on Educational Policy 121

TABLE OF CONTENTS

APPENDIX A
THE COMPOSITION OF ECONOMIC ACTIVITY IN ALBERTA

Agriculture 123
Forestry, Fisheries, Trapping 124
Mining 124
Petroleum Production 125
Natural Gas Production 125
Electric Power 125
Manufacturing 125
Construction 126
Service Sectors in Alberta 126
Wholesale Trade 126
Retail Trade 126
Community, Business, and Personal Services 127
Public and Private Investment in Alberta 127
Tables 128

APPENDIX B

REAL GROWTH IN ALBERTA PERSONAL INCOME 147

APPENDIX C:

CALCULATION OF PRICE INDICES 148

SELECTED BIBLIOGRAPHY 149

FOREWORD

Since early 1969, the Human Resources Research Council has sponsored a series of studies of the future. Two concerns have provided the impetus for these ventures:

1. A desire to inform the planning process in all areas of human resources development and to assist planners in advancing from a reactive to an anticipatory mode of plan development;
2. A desire to inform citizens of emerging trends in society and of the options open to them, so that they may be better able to shape their society and to avoid what has been called "future shock."

The study reported in this volume was sponsored jointly by the Human Resources Research Council and the Commission on Educational Planning. It is our hope that the study will assist that Commission, and others, to catch glimpses of alternative economic and demographic futures, to perceive their implications for social and educational policy, and to create the types of planning mechanisms that will be required to guide our educational systems into the future.

This study, the third in the series, was conducted by Don Seastone of the Department of Economics at The University of Calgary. The study, **An Outline of the Future: Some Facts, Forecasts and Fantasies** by Harold J. Dyck, George J. Emery, Harold Gruber, and Lylian Klimek, was produced in the summer of 1970. **Social Futures Alberta 1970 - 2005,** by Harold J. Dyck and George Emery, was published in December, 1970. A fourth report with the working title **The Future and Education: Alberta 1970 - 2005,** written by Human Resources Research Council staff and edited by Harold S. Baker, will be published in the early fall of 1971.

L. W. Downey, Director,

Human Resources Research Council of Alberta

PREFACE

This study has had two primary objectives: (1) to consider probable levels and distribution of Alberta's population from 1970 to 1980 and from 1980 to 2005, and to explore the implications of these population data for enrolment at various levels of the provincial educational process; (2) to consider the growth potential of the provincial economy, its implications for provincial government revenues, and the relationship among these revenue projections, potential educational costs, and projected personal income levels.

My charge from the Alberta Human Resources Research Council and the Commission on Educational Planning was to synthesize available data on population, enrolment, economic, cost, and revenue variables. The sponsors were not interested in abstract models of economic behavior for purposes of this study. Thus, the study should be regarded as a compilation of available data and analyses, and extensions of these data where necessary, according to a set of assumptions and analyses that reflect my judgment about probable future patterns of behavior.

The study was initiated in September, 1970 with a target completion date four months later. This meant that data collection could occupy about two months, and analysis, including a preliminary report to Congress on the Future: Education, about two months. The original study was revised for publication between February 1 and March 15, 1971.

For these and other reasons, the research methods used in the study are essentially descriptive, in the sense that there has been little opportunity to bring advanced methods of statistical analysis into the study.

The requirement that projections be made to 1980 and 2005 were stipulated by the sponsors, who realize the confidence problems these dates entail. Because of the Council's and the Commission's concern for long-range planning, projections of short-term intervals are of minimal value.

I am indebted to Dr. George Kottis, Assistant Professor of Economics at the University of Calgary, who wrote first drafts of Chapter II and Appendix A; to Alan Fox, Derek McManus, and Robert Ostry, graduate students in the Department of Economics at the University of Calgary, who acted as research assistants; to the Alberta Oil and Gas Conservation Board for extensive help in population projections; to the Alberta Bureau of Statistics, Department of Industry and Tourism, for assistance in gathering data about provincial economic performance; to the Alberta Department of the Treasury for projections of revenue flows to the Provincial Government; to the Universities Commission and the Colleges Commission for help in gathering data; and to many other public and private organizations and individuals for their help in data accumulation and analysis. Responsibility for analytical defects in the manuscript, of course, accrues to the author.

Finally, I would like to thank the Alberta Human Resources Research Council and the Commission on Educational Planning for the opportunity to participate, if somewhat frenetically, in their activities.

Don Seastone, March 15, 1971

LIST OF TABLES

Table No.		Page
I-1	Alberta's Population, Total and by Census Division, 1951-2005	27
I-2	Alberta's Population, Total and by Age Group, 1956-2005	28
I-3	Alberta's Population, by Age Group, 1980 and 2005	28
I-4	Alberta's Population, Total and by Sex and Age Groups, 1956-2005	29
I-5	Alberta's Urban Population, Total and by Census Division, 1951-2005	30
I-6	Alberta's Rural Population, Total and by Census Division, 1951-2005	31
I-7	Population of Calgary and Edmonton Census Divisions, Total and by Age Group, 1956-2005	32
I-8	Provincial Population Outside Calgary and Edmonton Census Divisions, Total and by Age Groups, 1956-2005	33
I-9	Population of Southern Region, Total and by Age Group, 1956-2005	34
I-10	Population of Central Region, Total and by Age Group, 1956-2005	35
I-11	Population of Northern Region, Total and by Age Group, 1956-2005	36
I-12	Population of Mountain Region, Total and by Age Group, 1956-2005	37
I-13	Population of Edmonton Region, Total and by Age Group, 1956-2005	38
I-14	Population of Calgary Region, Total and by Age Group, 1956-2005	39
I-15	Population by Religious Denomination, Alberta, 1961	40
I-16	French, Indian, and Eskimo Populations of Alberta by Region, 1961	41
II-1	Primary and Secondary Enrolments in Alberta, 1950-1970	59
II-2	Primary and Secondary Enrolment by Region, 1956-1970	60
II-3	Estimated Primary and Secondary School Enrolments, in Alberta, 1970-2005	61
II-4	Estimated Primary and Secondary School Enrolments, Southern Region, 1970-2005	61
II-5	Estimated Primary and Secondary School Enrolments, Central Region, 1970-2005	62
II-6	Estimated Primary and Secondary School Enrolments, Mountain Region, 1970-2005	62
II-7	Estimated Primary and Secondary School Enrolments, Northern Region, 1970-2005	63
II-8	Estimated Primary and Secondary School Enrolments, Calgary Region, 1970-2005	63

LIST OF TABLES

II-9 Estimated Primary and Secondary School Enrolments, Edmonton Region, 1970-2005 64

II-10 Kindergarten Enrolment as Percentage of Five-Year-Old Population, Canada and by Province 64

II-11 Actual and Potential Pre-School and Kindergarten Enrolment, Alberta, 1956-2005 64

II-12 Enrolment at Alberta Universities, by University and by Level of Study, 1958-1970 65

II-13 Estimated Full-Time Enrolment, Alberta Universities, 1970-1980 66

II-14 Estimated Full-Time Enrolment, Alberta University System, 1980-2005 66

II-15 Estimated Part-Time Enrolment, Alberta Universities, 1970-1980 67

II-16 Estimated Part-Time Enrolment, Alberta University System, 1980-2005 67

II-17 Post-Secondary Non-University Full-Time Enrolment, 1951-1968 67

II-18 Estimated Post-Secondary Non-University Full-Time Enrolment, 1970-2005 68

II-19 Expected and Actual Enrolments in Special Classes for Exceptional Children: Calgary, Edmonton, and Alberta, 1969-70 68

II-20 Enrolment in Special Classes, Alberta and Edmonton and Calgary Regions, 1969-70 69

II-21 Distribution of Tax Returns and Taxable Income by Income Group, Alberta, 1967 69

III-1 Canadian Gross National Product, Current and Constant (1957) Dollars, 1950-2005 82

III-2 Canadian Personal Income, Current and Constant (1957) Dollars, 1950-2005 82

III-3 Alberta Gross Provincial Product, Current and Constant (1957) Dollars, 1950-2005, Assuming 5 Per Cent Growth Rate Beyond 1970 83

III-4 Alberta Gross Provincial Product, Current and Constant (1957) Dollars, 1950-2005, Assuming 5.5 Per Cent Growth Rate Beyond 1970 83

III-5 Alberta Personal Income, Current and Constant (1957) Dollars 1950-2005, Assuming 5.5 Per Cent Growth Rate Beyond 1970 84

III-6 Alberta Personal Income, Current and Constant (1957) Dollars, 1950-2005, Assuming 5 Per Cent Growth Rate Beyond 1970 84

LIST OF TABLES

III-7 Net Value of Production of Primary and Secondary Business Sectors, Alberta, 1935-1969 85

III-8 Summary of Initial and Remaining Recoverable Crude Oil Reserves as of the End of Each Year, 1948-1969 86

III-9 Summary of the Growth of Initial and Remaining Established Reserves of Marketable Gas, 1948-1969 86

III-10 Labor Force 15 Years of Age and Over by Industry—Alberta 1951 and 1961, and for Major Cities, 1961 87

III-11 Changes in Employment by Industrial Sector, 1961-1969 87

III-12 Alberta Labor Force by Major Occupational Group, 1951-1961 88

III-13 Estimated Alberta Labor Force by Major Occupational Group, 1975 88

III-14 Potential Occupational Requirements, Alberta Labor Force, 1975-2005 89

III-15 Ratio of Labor Force to Population, Canada, 1951-1960 89

III-16 Ratio of Labor Force to Population in Selected Countries, 1962 90

III-17 Females as a Percentage of the Labor Force in Selected Countries, 1962 90

III-18 Male Population, Labor Force, and Participation Rates, by Age Group for Alberta, 1951-1961 91

III-19 Female Population, Labor Force, and Participation Rates, by Age Group for Alberta, 1951-1961 91

III-20 Projections of Potential Requirements in Professional and Technical Occupations, 1975-2005 92

IV-1 Projected Provincial Government Net General Revenue in Current Dollars, 1971-2005 114

IV-2 Projected Provincial Government Net General Revenue in Constant (1957) Dollars, 1971-2005 114

IV-3 Conditional and Unconditional Transfers from the Government of Canada to the Government of the Province of Alberta, 1958-1967 115

IV-4 Changes in Projected Provincial Government Net General Revenue in Current Dollars, 1971-2005, with a 1 Per Cent Increase in Personal Income Tax Rate, Every Five Years, 1970-1990 116

IV-5 Changes in Projected Provincial Government Net General Revenue in Current Dollars, 1971-2005, with a 5 Per Cent General Retail Sales Tax (Food and Drugs Exempted) 116

IV-6 Changes in Projected Provincial Government Net General Revenue in Current Dollars, 1971-2005, with Changes in Personal Income and Sales Tax 117

LIST OF TABLES

IV-7 Standardized Lifetime Earnings of Certain Professional Manpower, Canada, 1956 and 1966 118

A-1 Cash Income from Sale of Farm Products, Alberta, 1956-1968 128

A-2 Regional Location, Farm Machinery, Alberta, 1966 128

A-3 Manufacturing Industries Allied to Agriculture, Alberta, 1965-1969 129

A-4 Forestry Harvest, by Volume and Value, Alberta, 1968-69 129

A-5 Timber Resources of Alberta 130

A-6 Fur Pelts and Fisheries Production, Alberta, 1965-1969 130

A-7 Mineral Production, Alberta, 1941-1969 131

A-8 Crude Oil Production, Alberta, Western Canada, and Canada, 1948-1968 132

A-9 Estimated Proven Remaining Reserves of Liquid Hydrocarbons in Canada at Year End, 1956-1968 132

A-10 Petroleum Industry Activity, Alberta, 1947-1968 133

A-11 Alberta Crude Oil Fields Production, 1914-1968 133

A-12 Natural Gas Production, Alberta, Western Canada, and Canada, 1948-1968 134

A-13 Estimated Proven Reserves of Natural Gas in Canada at Year End, 1956-1968 134

A-14 Net Capability, Net Peak Load, and Net Generation by Type of Power Source, Alberta, 1968 135

A-15 Firms, Employees, Wages and Salaries, and Value Added by Manufacturing Sub-Sectors, Alberta, 1968 136

A-16 Manufacturing Activity by Regions, Alberta, 1968 137

A-17 Value of Factory Shipments by Manufacturing Sector and Sub-Sector, Alberta, 1957-1969 138

A-18 Value of Construction Work Performed—Alberta, 1954-1968 139

A-19 Value of Building Permits, Province and Regions, 1948-1969 140

A-20 Value of Building Permits, Selected Cities in Alberta, 1948-1969 140

A-21 Wholesale Trade, Trends, Alberta, 1966-1969 141

A-22 Retail Trade, Alberta, 1964-1969 142

A-23 Retail Trade by Selected Business Groups, by Region, and by Province, 1966 143

A-24 Community, Business, and Personal Services, by Province and by Region, 1966 144

A-25 Visitors to National Parks in Alberta, 1964-1969 144

A-26 Public and Private Investment, Alberta, 1948-1969 145

A-27 Public and Private Investment, Alberta, 1968 and 1969 146

LIST OF FIGURES

I-1 Projected Changes in Population by Census Division, 1970 to 1980 13

I-2 Projected Changes in Percentage Shares of Provincial Population by Census Division, 1970 to 1980 14

I-3 Projected Changes in Percentage Shares of Provincial Population by Census Division, 1980 to 2005 15

I-4 Projected Changes in Percentage Shares of Provincial Population by Census Division, 1980 to 2005 16

I-5 Age Distribution of Provincial Population, 1970 to 2005 18

I-6 Alberta's Rural and Urban Population, 1956 to 2005 20

I-7 Population Concentrations in Edmonton and Calgary Census Divisions, 1956 to 2005 21

I-8 Geographic Regions of Alberta 23

I-9 Location of Provincial Population by Region—1970, 1980, and 2005 25

II-1 Primary and Secondary School Enrolment in Alberta, 1950 to 1970 42

II-2 Estimated Primary and Secondary School Enrolment, 1970 to 2005 44-45

II-3 Actual and Projected Kindergarten Enrolment as Percentage of Five-Year-Olds, Canada and by Province 48

II-4 Estimated Full-Time University Enrolment, 1980 to 2005 51

SUMMARY

ALBERTA AND HER PEOPLE, 1970 TO 2005

The first specific consideration of this study deals with the probable level, composition, and geographic distribution of the population of Alberta from 1970 to 1980, and from 1980 to the Centennial year 2005, using population projections provided by the Alberta Oil and Gas Conservation Board. Essentially, the Board uses mortality rates, age-specific fertility rates, and migration as the determinants of population levels. The projections recognize the declining provincial birth rates that began about 1961 and postulate a continued high level of net migration into the province throughout the forecast period. The population data provided by the Board include considerable detail on age, sex, and geographic distribution of provincial population.

An increase of about 23 per cent in the total population of Alberta is projected for the decade between 1970 and 1980. The level is expected to reach about 1,950,000 by 1980, 2 million by 1981, and 3 million by 2005. Throughout the forecast period, the rate of population growth is about 1.9 per cent per year. While population estimates often turn out to be conservative, changing social values and institutional developments such as birth control and the zero population growth movement may well keep the provincial population within the projected growth rates.

Age Groups

An interesting characteristic of the growing population is expected to be the decline in the under-25 age group as a percentage of total population. From 1956 to 1970 this age group increased from 47.6 per cent to 50.6 per cent of provincial population. After 1970, however, this percentage distribution is expected to decline, to 47.1 per cent by 1980 and to 42.8 per cent by 2005. Thus, as the under-25 age group grows from about 803,000 in 1970 to about 924,000 in 1980, the rate of increase is only 15 per cent compared to the rate of 23 per cent for the total Alberta population. Beyond 1980, as it continues to decline as a percentage of provincial population, the under-25 age group is expected to increase by 15,000 per year to about 1,300,000 by 2005.

In the under-25 age group, the 6-11 elementary school age group falls from 16 to 12.2 per cent of the provincial population between 1970 and 1980, a decline associated with an absolute decrease in the number of 6-11 year-olds, from about 255,000 in 1970 to about 240,000 in 1980. A similar decline occurs in the 12-17 age group in the last five years of this time period, as the 230,000 figure of 1975 declines to about 207,000 in 1980. Beyond 1980, both age groups are expected to experience continuous increases in numbers of potential school enrolees.

The decline in elementary and secondary school populations will be reflected in a subsequent decline in the post-secondary education age group from 1980 to 1990. From 1980 to 1990, the 18-24 age group falls from a level of about 273,000 to about 246,000. Beyond 1990, it is expected that the 18-24 age group will increase by nearly 7,000 per year, to nearly 352,000 by 2005.

Regional Distribution of the Population

The continued migration of Alberta's population to urban places in recent years produced a 71 per cent urban population by 1970. This trend will produce an 80 per cent urban population by 1980, and more than 90 per cent of Alberta's 3 million people are expected to live in urban places by 2005. An urban place as defined by the census is a concentration of 1,000 or more persons.

As the trend to urbanization continues, so will the dominance of the Edmonton and Calgary Regions as population centers. In 1956, the Edmonton and Calgary census division regions already accounted for more than 50 per cent of the provincial population. By 1970 the figure was approaching 60 per cent, and by 1980 it is expected to be greater than 63 per cent. By 2005, more than 70 per cent of the provincial population is expected to be concentrated in these two urban census divisions, both of which are likely to have populations in excess of 1 million persons.

To analyze spatial changes in population, Alberta's 15 census divisions have been combined into six geographical regions. The Southern region is comprised of Census Divisions 1, 2, and 3 and will fall from about 9.7 to 8.4 to 6.2 as a per cent of the total provincial population by 1980 and 2005. The absolute size of population will increase by about 25,000 and the population growth center is expected to be the City of Lethbridge, in Census Division 2.

The Central Region, comprised of Census Divisions 4, 5, 7, 8, and 10, will also experience a decline from about 15.8 per cent to 13.6 per cent between 1970 and 1980, and from 13.6 to 9.8 per cent between 1980 and 2005 as a percentage of the provincial population. As the population level in the Central Region increases from about 250,000 in 1970 to 266,000 in 1980 and 296,000 in 2005, Census Division 8 and the area around Red Deer will account for most of the growth.

The Northern Region of the province, which encompasses Census Divisions 12, 13, and 15 will experience the largest growth outside the Edmonton and Calgary regions. The Northern Region will grow from about 197,000 people to nearly 236,000 from 1970 to 1980 and by another 100,000 persons from 1980 to 2005 .The regional population, clustered around growth centers such as Ft. McMurray in the northeast and Grande Prairie in the northwest, will decline as a percentage of provincial population from 12.4 to 12.1 to 11.1 during the forecast period.

The Mountain Region, comprising Census Divisions 9 and 14, will constitute between 2.6 and 2.7 per cent of the provincial population from 1970 to 1980 and 2005. The level of population, centering around Hinton, Jasper and Banff, is expected to increase from nearly 41,000 in 1970 to about 51,000 in 1980, and about 80,000 in 2005.

The Edmonton Region (Census Division 11) and the Calgary Region (Census Division 6) are expected to grow at about 2.3 per cent and 2.7 per cent respectively from 1970 to 1980 and 2005. The Edmonton Region will have about 34.5 per cent of the Alberta population in 1980, compared to 33.1 per cent in 1970. By 2005 the number of people in the Edmonton Region will grow from 676,000 in 1980 to more than 1,100,000, 36.8 per cent of Alberta's total. At the same time, the Calgary Region will probably experience the fastest growth rate of any region in Alberta. From about 26.4 per cent in 1970, the Calgary Region is expected to increase to 28.8 per cent of the provincial population in 1980 and to 33.4 per cent in 2005. By 1980, the regional population is expected to reach about 564,000 and to exceed 1 million people by 2005.

An interesting characteristic of the provincial population between 1970 and 2005 will be the close relationship between the numbers of the male and female components. At the present time there is a slight male majority in the population; by 2005 this will change to a slight female majority.

Somewhat surprisingly, analysis of regional population reveals no dramatic differences among percentage distribution of age groups within a region. In 1970, for example, about 33.1 per cent of the total Alberta population is in the Edmonton Region. Among the age groups, the variation is between 34.6 per cent of the 0-4 age group and 32.1 per cent of the 12-17 age group. The university age group, 18-24, is only 33.4 per cent of provincial population in that age bracket. The same close relationships are projected for 1980 and 2005.

Provincial Enrolment in Educational Institutions

In recent years, enrolment in Alberta at various educational levels has experienced uninterrupted growth. At the primary and secondary school levels, for example, enrolment has increased steadily in every grade. Thus, the 174,000 enrolment level of 1950-51 had grown to nearly 410,000 by 1969-70. Although all provincial regions experienced absolute increases in the number of Grades 1-12 enrolees, all regions outside the Edmonton and Calgary Regions experienced a decline in their shares of the total enrolment. From 1950-51 to 1969-70 the Edmonton Region increased its share of total enrolment from 26.9 to 32.5 per cent. Simultaneously, the Calgary Region experienced an increase from 18.5 to 25.3 in its percentage of provincial 1-12 enrolment.

The massive increase in public school enrolment in the last 20 years is explained not only by population increases in the 6-17 age groups but also by significant increases in the education participation rates of the 14-17 age group. In 1950-51 only about 59 per cent of the 14-17 age group was enrolled in public schools. By 1969-70 the rate had increased to 96.5 per cent. This change in participation rates explains in part the decrease in Grades 1-6 enrolment as a percentage of total enrolment, from nearly 64 per cent in 1950-51 to less than 55 per cent in 1969-70. Accordingly, enrolment in Grades 7-12 increased from about 36 per cent to about 45 per cent of public school enrolment during this period.

The steady growth that typified public school enrolments during the last 20 years is not expected to follow the same even course from 1970 to 1980 and beyond. In fact, provincial enrolment in Grades 1-6 is expected to fall from about 221,000 in 1970-71 to about 196,000 by 1975-76. A 30,000 increase in expected enrolment in Grades 7-12 will mean a small increase in total enrolment of about 6,000 during this period. In the subsequent 5-year period, however, enrolment in grades 7-12 will reflect the previous decline in Grades 1-6 enrolment and will fall by nearly 24,000. A slight increase in Grades 1-6 enrolment will not offset the decline in Grades 7-12 enrolment, and the total enrolment of about 415,000 in 1980-81 should be nearly 17,000 less than that of 1975-76. In fact, the total enrolment in 1980-81 will be about 8,000 less than in 1970-71.

Beyond 1980, the enrolment at public schools is expected to resume a relatively steady growth path. Between 1980 and 1990, public school enrolment is expected to increase by about 100,000 to a level of nearly 509,000, and in the ensuing 15-year interval to increase by another 103,000. Thus, public school enrolment in 2005 should approximate 612,000.

Not all regions are expected to show the same rate of increase in the provincial enrolment. Enrolment totals in the Southern and Central Regions are expected to be less in both 1980 and 2005 than in 1970, in absolute as well as relative terms. In both cases, however, enrolment will increase between 1980 and 2005, peaking in the period around 1995. In the Northern Region, the enrolment will fall in a fashion parallel to the provincial enrolment by 1980, but it will increase consistently thereafter. The Mountain Region enrolment will climb gradually during the forecast period, but will represent only 2.6 to 2.8 per cent of the total enrolment throughout.

As the population data suggests, enrolment growth will be concentrated in the Edmonton and Calgary Regions. From 1970 to 1980, enrolment in the Edmonton Region will grow from 32.8 per cent to 34.2 per cent of total provincial enrolment; by 2005 it will reach 36.2 per cent. The total enrolment in the Edmonton Region should approximate 140,000 in 1980 and 223,000 in 2005.

The Calgary Region is the only region that can expect a continuous increase in enrolment throughout the 1970 - 2005 period, even within the next ten years. From 24.8 per cent of provincial enrolment in 1970, the Calgary Region will see its share of the total provincial enrolment increase to 28.3 per cent in 1980, and 33.7 per cent in 2005. Enrolment in Grades 1-12 should approximate 117,000 in 1980 and 205,000 in 2005. Thus, the Edmonton and Calgary Regional enrolment of 425,000 will represent about 70 per cent of the total provincial enrolment at primary and secondary levels by 2005.

Potential Kindergarten and Pre-School Enrolment

According to a recent study by the Economic Council of Canada, Alberta is the only province without firm plans for a comprehensive public school kindergarten program. By 1980, every other province is expected to have at least a 60 per cent participation rate of 5-year olds in public kindergartens, while Alberta's projected rate of participation in private kindergartens is about 9 per cent.

If the province were to initiate a public kindergarten program, and to reach by 1980 the participation rate already existing for Canada as a whole, about 63 per cent of its 5-year old children would be enrolled, a kindergarten enrolment of about 24,000. If the participation rate increased to involve **all** 5-year olds by 2005, about 54,000 students would be enrolled at the kindergarten level. If the same participation rate is applied to pre-school education for 3-and 4-year olds, the potential level of enrolment would be nearly 51,000 in 1980, and about 111,000 in 2005.

University Enrolments

The Province of Alberta experienced a five-fold increase in university enrolment from fewer than 6,000 in 1959 to more than 26,000 full-time students in 1969. At the same time, the part-time enrolment increased from fewer than 4,000 to nearly 14,000. By 1980 the medium estimate of the Universities' Commission projects a full-time enrolment at Alberta universities of more than 58,000 students. Of this total, more than 8,000 will be at the graduate level. The increase in university enrolment is postulated on population projections and an increase in the participation rates of the 18-24 age group in universities to 21.5 per cent in 1980. This participation rate is below that projected by the Economic Council of Canada.

If the relationship between full-time and part-time university enrolment is the same in 1980 as it was in 1970 — somewhat over 50 per cent — then part-time university enrolment in 1980 will approximate 31,000, including both graduate and undergraduate students.

Beyond 1980, it is postulated that the participation rate of the 18-24 age group in provincial universities will continue to increase beyond the 21.5 per cent figure assumed for 1980. Despite this increase in participation rate, however, the enrolment increase in Alberta universities between 1980 and 1990 will be quite modest because of the age distribution of population and the smaller output of secondary schools. During the decade, if the participation rate increases from about 21.5 to about 25.6 per cent of the 18-24 age group, total full-time enrolment at universities will increase by only about 4,000 to a level of about 63,000. Beyond 1990, however, full-time enrolment at universities will increase rapidly, partly because of postulated increases in the participation rate. By 2005, the effective participation rate of full-time university students is expected to reach about 34.4 per cent, less than that reached by extrapolating Economic Council participation rates from 1980 to 2005.

Given these population and participation rate assumptions, full-time enrolment in Alberta universities in 2005 should approximate 121,000. Of this total, more than 88,000 would be undergraduates and nearly 33,000 graduate students. Graduate enrolment is expected to increase significantly as a percentage of total enrolment.

Part-time enrolment is again projected to remain a constant percentage of full-time enrolment, just over 50 per cent. If this proves to be the case, and continuing adult education continues to be an important element of university enrolment, part-time enrolment will increase from nearly 31,000 in 1980 to just over 32,000 in 1990, reflecting the stability in university full-time enrolment during the decade. After 1990, however, part-time enrolment should also follow a brisk growth path to nearly 61,000 part-time students by 2005.

Post-Secondary Non-University Education

Educational opportunity beyond high school but separate from the university system has become an important ingredient of the educational progress in Alberta. From the 1,600 students enrolled in 1951, full-time enrolment at post-secondary non-university institutions increased continuously throughout the 1950's and 1960's. By the 1967-68 school year, full-time enrolment had reached a level of nearly 7,000 students.

Between 1951 and 1962, enrolment in post-secondary non-university institutions declined in relation to university enrolment from about 53 per cent to less than 30 per cent. Then, during the 1960's, the relationship began to change and by 1967 full-time enrolment in non-university post-secondary education was back up to more than 35 per cent of university enrolment.

The prediction of the Economic Council of Canada that non-university post-secondary enrolments will continue to increase at a faster rate than university enrolments during the next decade is accepted in projecting non-university enrolment. Simultaneously, there will be an increase in the participation rate of the 18-24 age group enrolled in post-secondary non-university institutions. This participation rate was about 3.5 per cent in 1966.

By 1980, full-time enrolment at post-secondary non-university institutions should increase to about 47 per cent of the full-time enrolment at universities, according to the Economic Council of Canada study. This projection appears to be consistent with what seems to be increasing provincial government concern for technical and vocational opportunities outside universities. If the observation is accurate, post-secondary non-university enrolment at vocational institutes, junior colleges, agricultural colleges, etc., should approximate 27,600 full-time students by 1980, about 10 per cent of the 18-24 age group.

Beyond 1980, the province may find that its optimal educational approach involves a fairly constant relationship between university and non-university post-secondary enrolment. The needs of an increasingly technological economic process will require greater educational attainment at both the university and non-university post-secondary level. Thus, there is some reason to believe that the percentage relationship between enrolments at the two levels of post-secondary educational endeavor will tend to remain fairly constant. For purposes of this analysis, then, full-time non-university post-secondary enrolment has been projected at a constant 47 per cent of full-time university enrolment. If this assumption is borne out, full-time enrolment at non-university post-secondary institutions will swell to nearly 57,000 students by 2005.

The participation rate for this group of students as a percentage of the 18-24 age group will be a little more than 16 per cent. This, combined with the 34 per cent participation rate projected for university enrolment, means that more than 50 per cent of the 18-24 age group will be full-time students in 2005. Given the nature of society at the Centennial year and the level of total and per capita incomes, this may well turn out to be a conservative estimate.

With regard to part-time enrolment at non-university post-secondary institutions, the current pattern appears to include at least as many part-time as full-time students. Given the increasing demands for re-training, growing interest in the cultural values associated with continuing education, and other complementary social factors, there is little if any reason to believe that part-time enrolment will decline in relation to full-time enrolment, particularly at the post-secondary non-university level.[1]

Personal Income in Alberta, 1980 and 2005

Personal income may be thought of as the flow of income accruing to households, from which personal consumption expenditures, personal tax and social insurance contributions, and personal savings are made. The level of personal income accruing to residents of Alberta has demonstrated a lively growth rate in recent years, increasing at an average rate of about 5.6 per cent per year in real terms. Thus, from 1950 to 1960, the level of personal income more than doubled, from less than $1 billion a year to a level of more than $2 billion in 1960, measured in current dollars. The high provincial economic growth rate produced a personal income level of nearly $2,900,000,000 by 1965. In 1970 the estimated level of personal income is in the neighborhood of $4,600,000,000. (These measures are in current rather than constant dollars.) The average rate of price inflation during the period from 1957 to 1969 was more than 2 per cent per year. Given an increase of about 5.6 per cent in real growth and a 2 per cent-plus inflation factor, it was not unusual for personal income to increase by 8 per cent per year during this time period.

The level of personal income divided by the provincial population provides a more accurate measure of changes in the level of economic welfare than does the total value of personal income. This per capita level of personal income discounts the rate of population growth to show the increase in personal income per person and per family. During the last 20 years, as population has grown at a rate of about 2 per cent per year, the 5.6 per cent growth in real personal income means that real per capita personal income in the province has increased about 3 per cent per year, on the average. Thus, in 1950, per capita personal income in 1950 dollars was a little more than $1,000. By 1960, in 1960 dollar terms, per capita personal income was slightly in excess of $1,600. In 1970 it is estimated that per capita personal income in the province is about $2,900 in current dollars. The rapid increase in recent years is explained by a slight acceleration in the rate of real growth and a rapidly rising price level since 1966.

Looking to the future growth of personal income and personal income per capita in the province, the economic growth rate is projected at a conservative 5 per cent in real terms. A price inflator of 2.5 percentage points per year is assumed.

Based on this set of assumptions, it is likely that the level of provincial personal income will approach $9,000,000,000 in 1980, in current dollar terms. The corresponding figure for per capita personal income is nearly $4,600, again in 1980 rather than constant dollars. If the average family size in Alberta in 1980 were four, then average family income would exceed $18,000. If this sounds overly optimistic, it should be recalled that the projected growth rate in personal income is less than the realized growth rate of recent years.

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[1] In Chapter IV, alternative sets of enrolment estimates are developed for university and other post-secondary institutions based on an array of possible participation rates.

By 1990 personal income in current dollars should approximate $17 billion. Given that real income is increasing at 5 per cent, and population at less than 2 per cent, the per capita personal income level in current dollars in 1990 will be almost $7,000 or nearly $30,000 per family of four.

Personal income will reach a level of about $42 billion in the year 2005. This provincial personal income divided by more than 3 million Alberta residents entails a per capita personal income of nearly $14,000 in current dollars.

The Determinants of Economic Growth in Alberta

Projecting real economic growth in Alberta at 5 per cent during the next 35 years assumes a continuation of the growth forces that have generated the economic development and rising living standards characteristic of the last 20 years.

A geographic region such as Alberta attains a high rate of economic growth by virtue of its ability to develop a set of basic industrial sectors which satisfy export demand for goods and services. In the case of Alberta, these basic sectors center around the extraction and processing of mineral resources, the growth and harvesting of agricultural products, the manufacture of intermediate and final goods, and the provision of a continuing set of goods and services for sale to tourists from outside the Province. Growing up around these sectors is another set of industrial and commercial activities providing a basic set of supporting activities and many of the amenities of economic life. At some point in the growth process, regional growth centers such as Edmonton and Calgary begin to achieve an internal growth force that makes it possible for a whole set of business activities such as construction, manufacturing, and professional services to expand their production processes by replacing imports as a source of supply. Economists often refer to this phenomenon as the agglomeration effect.

Continued economic growth in Alberta will be determined by the ability of business firms to apply an increasingly complex technology to the resource base which gives the province a real comparative advantage in the production of a basic set of goods and services, ranging from mineral products to tourist services. In fact, it is this application of technological know-how that explains a large part of the process of economic growth, according to most studies of economic growth in Canada and the United States.

The significance of this growth process is that the 5 per cent growth rate will be dependent upon the ability of the province to continue a high level of export activity, such as coal to Japan, natural gas to the United States, and petroleum to other provinces. Ghost towns in Canada and throughout the world offer convincing evidence of what happens to economic growth in a community when a resource is exhausted or when export demand for that resource terminates.

Thus, the assumption in growth rate projections that needs to be made explicit is that the province will continue to take full advantage of those export markets for crude petroleum, natural gas, agricultural products, etc., that exist now and in the future. The attendant assumption is that the province will resist the advice to preserve, for example, its fossil fuel resources for possible local use at some indeterminate date in the future. The real cost of this kind of waiting game is continued growth in total and per capita personal income.

The province appears to have a probable supply of its most important exhaustible resources — petroleum and natural gas — to satisfy increased export demands throughout the forecast period. The supply of coal is also capable of meeting a strong increase in export demand. With regard to renewable resources such as water, forests, agricultural land, and their tourist-related components, an advanced systems approach to land and resource planning should produce continued economic and social potential.

Provincial Government Revenues, 1980

Based on a set of economic growth factors supplied to them, the Bureau of the Budget of the Alberta Treasury Department has provided a set of estimates of total and specific revenue flows to the provincial government. By way of background, provincial government revenues totalled $285,000,000 in fiscal 1957. By fiscal 1968 this revenue total, according to the Dominion Bureau of Statistics, had increased about 200 per cent to $813,000,000. During this same time period, personal income increased about 167 per cent.

Looking to the future, the Provincial Treasury Department estimates that the elasticity of personal income taxation with respect to personal income will be about 1.5 per cent per year. Thus, with a five per cent growth in personal income, personal income taxes will increase by about 7.5 per cent. This derives, of course, from the increasing rate structure associated with higher average incomes. The corporate income tax is assumed to have an elasticity coefficient of .9 per cent with respect to Gross Provincial Product. Many revenues, for example tobacco taxes, motor fuel, and liquor revenues are assumed by the department to be a function of population rather than income.

Based upon these assumptions and the existing tax system, provincial government revenues should approximate $2,082,000,000 by 1980. Of this total, $497,000,000 would derive from personal income taxes, $155,000,000 from corporate income taxes, and about $651,000,000 from oil and natural gas royalties, bonuses, etc. The $2 billion does not include grants from the federal government.

Allocation of Provincial Government Revenues, 1980

As a guideline for the allocation of provincial revenues in 1980, it may be instructive to look at the relationship between these revenues and educational expenditures in 1968. According to data provided by the Dominion Bureau of Statistics, provincial government revenues in 1968 totalled $812,900,000. Of this total, provincial government expenditures for all levels of education claimed about $285,000,000 according to the Dominion Bureau of Statistics. This expenditure total for education represented about 35 per cent of provincial revenues that year. According to Professor Eric Hanson of the University of Alberta, who has done a continuing series of studies on educational finance in the province, this expenditure by the province was about 6.8 per cent of provincial personal income in 1968. Total spending on education was about 14 per cent of personal income.

In 1980, it is estimated that the personal income of Alberta in current dollars will approximate $8,954,000,000. This assumes a 5 per cent real growth rate and a price inflator of 2.5 percentage points per year throughout the period. If total spending for education in the province amounts to about 14 per cent of personal income, as it did in 1968, some $1,253,560,000 will be available.

Professor Hanson has noted, however, a propensity for the province to allocate an increasingly large share of its personal income to education. From 1960 to 1968, for example, the percentage of provincial personal income devoted to educational expenditure by the provincial government increased from 4.2 to 6.8 per cent. If the provincial government and the taxpayers look with continued favor at the need for a higher quality education, it is not inconceivable that by 1980 about 10 per cent of provincial personal income might be allocated to educational activities by the provincial government. In this case, provincial government spending for education would amount to about $895,400,000. If local government continued to support education in the amount of about 5 per cent of personal income, and if federal and miscellaneous revenue remained at 12 and 6 per cent, respectively, of provincial and local government spending, then total funding for education would rise to about $1,500,000,000.

In this case, education would account for about 43 per cent of provincial government revenues, contrasted to the approximately 35 per cent now so allocated. At the higher level of educational expenditure, in other words, other functions of the provincial government would command only 57 per cent of total spending, compared to the 65 per cent now employed for non-educational activities. Given the $2-billion-plus revenue level predicted by 1980, this would amount to about $1,180,000,000 available for all other expenditures of provincial government. On a per capita basis, the 7 per cent of personal income spent by provincial government for education would amount to $311; the 10 per cent figure would amount to $452 per capita.

An alternative to reallocation of existing revenues to education from other provincial government functions, of course, is a change in the tax structure permissive of an increase in provincial government revenues of about $300,000,000. In this instance, it is necessary to assume that tax increases of this amount would be used for educational spending by the provincial government, bringing the level to about $900,000,000.

This obviously is a delicate area and the following analysis makes no judgment pursuant to the desirability of tax increases for educational spending. It has been necessary, however, to postulate certain changes in the tax structure to test their impact on revenue totals. For example, an increase of 3 points in the personal income tax operative in 1980, would probably yield about $45 million on extra provincial government revenue, according to an analysis provided by the Bureau of the Budget of the Provincial Treasury Department. A 5 per cent general retail sales tax, food and drugs exempted, would yield about $278,000,000 in 1980. Both changes in tax structure, then, would yield more than $320,000,000 in incremental revenues.

The Cost of Education

The problem of allocating public revenues to education has been approached thus far according to the budgeting model of cost-effectiveness. Under this system of allocating public sector revenues, a given activity is allocated a specific amount of money and seeks to maximize the flow of outputs, benefits, etc., available from that revenue-expenditure level. Alternative to this technique is the attempt to estimate the total costs of education by 1980 under various assumptions about educational costs in light of postulated enrolment figures.

According to studies performed by Professor Hanson, the expenditure per student in elementary and secondary education in 1968-69 was about $650. This was referred to as operating expenditure, but it included a debt service charge on funds borrowed for capital spending. Thus, it approximates the annual average total cost of elementary and secondary schooling for that year. For 1980-81, Professor Hanson estimates a cost per student of $1,870, an increase in per student costs per year of about 9 per cent. As a starting point in cost estimates, a lower rate of growth is assumed in cost per student, to a doubling of per student costs by 1980-81, to about $1,300 per student. In this case, costs are increasing slightly less than 6 per cent per year per student; and an elementary and secondary enrolment of 415,000 students would generate total costs of about $540,000,000 in 1980-81. A higher estimate, derived from Hanson's $1.870 estimate for 1981-82 and rounded to $1,800 for the previous year, would yield a total cost of $747,000,000.[2]

Total operating expenditures for universities in 1968-69, calculated in terms of expenditures per full-time student, were about $2,800 per year. This figure relates to total operating expenditures and thus includes expenditures designed to accommodate part-time as well as full-time students. Capital expenditures during the five-year period ending in 1968-69 averaged about $36 million per year and were made from current revenue, not borrowings.

Following the procedures used in estimating the costs of primary and secondary education, a first assumption doubles operating expenditures per full-time student in the university system by 1980-81. Thus, operating expenditures per full-time student would be about $5,600 per year. This rate of increase approximates the experience of the last few years, in which operating expenditures per student have tended to increase about $200 per year. If, by 1980-81, there are 58,615 full-time students in provincial universities, and the cost per full-time student is $5,600, total operating costs will approximate $328,000,000, a low estimate. On the capital costs side of the ledger, the low estimate will be based on a doubling of capital expenditures from the 1964-69 average of $36,000,000 to a level of $72,000,000 in 1980-81. The actual ratio of operating to capital costs was less than 2 to 1 in 1968-69, about $64,000,000 in operating costs to $36,000,000 average capital costs for the five-year period ending in 1969. In fact, annual operating expenditures from 1964 to 1969 were about $41,000,000 compared to the average annual capital expenditures of about $36.000,000. Even a 2 to 1 ratio of operating to capital costs in a period of rapid growth seems conservative. Thus, the ratio of operating to capital costs has risen from an actual ratio of less than 2 to 1 to a hypothetical ratio of more than 4 to 1 in this low estimate.

A high estimate for university operating costs in 1980-81 is derived in the same way that the high estimate for total costs was derived for elementary and secondary education. That is, costs per student between 1968-69 and 1980-81 are assumed nearly to triple. For Alberta universities, this would mean an operating expenditure per student of about $8.000. With an estimated university enrolment of 58,615 students, total operating costs will then run to $469,000,000. The second element of the high estimate for university costs in 1980-81 is capital expenditures, which represent 50 per cent of operating costs. For 1980-81, this figure would be $235,000.000, half the operating expenditure of $469,000,000. Total university spending in this high estimate would then be about $704,000,000.

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[2] **All these figures include a debt service charge derived from funds borrowed for capital spending. It is assumed that all capital funds are borrowed; therefore, the debt service charge represents current costs of capital spending.**

Post-secondary non-university education represents an increasingly important component of the educational structure in Alberta. It includes all post-secondary education outside the universities, such as junior colleges, vocational and technical institutes, and agricultural colleges. Within the next ten years this component of post - secondary education is expected to increase relative to university education, with an estimated enrolment of 28,000 full-time students by 1980. Costs of full-time enrolment are difficult to measure because so much of the current activity represents part-time enrolment. Nonetheless, available cost data are not inconsistent with the hypothesis that it costs the province about half as much per student in operating expenditures for a non-university student as it does for a university student. This is the assumption built into cost projections for non-university post-secondary education. Thus, a low estimate for these costs in 1980 includes a $2,800 per student operational expenditure, half the estimated low cost for university students in that year. With an expected enrolment of 27,600, this would mean a total operating cost of about $77,000,000. Capital expenditures in this low estimate are assumed to be half the capital expenditures in the low estimate for university capital costs, since the student population is nearly half the university student population. This would entail capital expenditures of about $36,000,000.

The high estimate of operating costs of post-secondary non-university institutions is based on a full-time student expenditure of $4,000, again half the high estimate for full-time university operating costs. Based on this assumption, the operating costs of 27,600 full-time students would approximate $110,000,000. Correspondingly, the high estimate assumes a 2 to 1 ratio between operating and capital costs, and therefore a capital expenditure of $55,000,000.

For post-secondary non-university institutions, then, the more conservative approach yields a total cost estimate of about $113,000,000 in 1980; the less conservative approach yields a total cost estimate of nearly $165,000,000.

Total Costs of Education, 1980-81

The following table summarizes educational costs for Alberta in 1980, given the two sets of assumptions discussed above. A much larger set of enrolment and cost estimates is included in Chapter IV.

Low Estimate

	Operating Costs	Capital Costs	Total
Primary and Secondary	$ 540	—	$ 540
University	$ 328	$ 72	$ 400
Post-secondary non-university	$ 77	$ 36	$ 113
Total	$ 945	$ 108	$1,053

High Estimate

	Operating Costs	Capital Costs	Total
Primary and Secondary	$ 747	—	$ 747
University	$ 469	$ 235	$ 704
Post-secondary non-university	$ 110	$ 55	$ 165
Total	$1,326	$ 290	$1,616

Total costs under the more conservative assumptions come to $1,053,000,000. Total costs under the less conservative assumptions are $1,616,000,000. The low cost estimates, related back to the previous discussion of personal income allocated to education, do not suggest financial difficulties in meeting educational cost requirements if educational costs are approximately predicted via the low cost method. It will be recalled that the province will have some $1,250,000,000 available for education spending, under the set of assumptions discussed previously under cost-effectiveness analysis. The most important assumptions relate to the projected level of personal income and the province's propensity to allocate about 7 per cent of this personal income to education through provincial government spending, 5 per cent through local government spending, and continued federal and miscellaneous contributions amounting to about 2 per cent of personal income.

There is nothing in the history of the province to suggest that it will deny at least this percentage of personal income to educational activity. In fact, as noted previously, there has been a consistent propensity to increase the share of personal income allocated to education. This being the case, it would be feasible by 1980, under the foregoing set of assumptions, to contemplate pre-schools and kindergartens with the enrolment levels discussed previously. Under the assumption of similar costs for pre-schools and kindergarten, as for other primary and secondary education, in 1980 pre-schools for three and four-year olds based on the low cost estimates would cost about $66,000,000; kindergartens for five-year olds would cost about $32,000,000. Thus, both forms of pre-school would be available at a total annual cost of about $98,000,000. At the higher estimated cost levels, the corresponding figures would be about $91,000,000, $43,000,000 and $134,000,000.

On the other hand, if the high estimates made previously turn out to be a better guide to educational costs, the $1,616,000,000 total expenditure would be beyond the estimated capacity of the province without major changes in the provincial revenue structure. As projected at existing rates of personal income allocations to education, a gap of about $300,000,000 would exist. This gap would yield to increases in the tax structure as mentioned before. On the other hand, the hiatus between the higher estimate of total costs and projected revenue flows would also yield to inter-governmental grants from the federal government to the provincial government. With the basic changes in federal grants that came into existence in 1967-68, for example, the federal government has minimized its direct payments to universities, and reimburses the province to 50 per cent of the cost of approved operating expenditures for post-secondary education. The impact of this change upon educational costs in the province becomes a vital part of any discussion of educational finance in the future. If this practice were continued at the 50 per cent level to 1980, federal contributions could amount to more than $200,000,000, even under the lower estimates of educational costs, and federal grants might reach $300,000,000 under the higher estimates. Moreover, if federal matching grants were available for capital as well as operating expenditures, then additional federal funds amounting to somewhere between $50 and $150,000,000 would be forthcoming, according to estimated levels of capital expenditures.

In summary, if total costs of education are held with the $1.2 to $1.4 billion range, it may be possible to meet this obligation without tax increases. This thesis, however, is based upon two major conditions: (1) that federal grants for post-secondary education continue to expand as suggested by the changes enacted in 1967; (2) that provincial revenues from oil and gas actvity continue to expand as projected by the Bureau of the Budget. Any tendency that violates either condition is likely to involve a set of difficult choices for the province, relating to increasing provincial taxes on the one hand or compromise in the quality of educational services on the other.

Educational Costs, Personal Income, and Provincial Government Revenue, 2005

The potential magnitude of total expenditures for education in 2005 is illustrated by the following data:

Primary and secondary schools	$2,680,818,000
University, operating costs	$2,294,226,792
University, capital costs	$1,147,113,396
Other post-secondary, operating	$ 540,284,360
Other post-secondary, capital	$ 270,142,180
Total educational costs	$6,932,584,728

The cost estimate for primary and secondary schools is derived from the single enrolment estimate made in Chapter II, an increase of about 6 per cent in per student operating costs per year to 1980, and a further increase of 5 per cent per year per student from 1980 to 2005. In 2005 this amounts to a per student cost of $4,402.

The university operating cost is based on the medium enrolment estimate explained in Chapters II and IV. It also assumes that operating costs per student increase about 6 per cent per year to 1980 and at a rate of 5 per cent per year per student from 1980 to 2005. This would entail a cost per student of $18,964 by 2005.

The university capital costs estimate is based on the high method of projecting capital cost, i.e., that capital costs will approximate 50 per cent of operating costs.

The non-university post-secondary operating cost estimate is also based on the medium enrolment estimates outlined in Chapters II and IV. It allows for the 6 per cent rate of increase in per student cost per year to 1980 and a 5 per cent increase from 1980 to 2005. In the latter year, per student costs would then approximate $9,482 per year in the operating budget. The capital cost budget again assumes that capital costs would be 50 per cent of operating costs.

Analyzing this total cost structure of nearly $7 billion, the first feature of the system to command attention is the fact that it would require about 16.5 per cent of projected personal income to fund these educational programs. The picture is obviously much different than that afforded by the projected data of 1980, particularly when the 16.5 per cent does not include projected costs of pre-school and kindergarten programs.

The cause of the difference is not hard to find. In the projection for 2005, university costs have increased to nearly half the spending total, from about 43 per cent in 1980. This results from the assumption of a significant increase in participation rates of the 18-24 age group from 1980 to 2005, and the fact that it costs much more on a per student basis at the university level than at other levels of education. The increase in projected educational costs is probably inevitable in the sense that it incorporates a community decision to make post-secondary education available to a larger percentage of the population. This decision, if actually made, will be difficult to implement without some increase in the percentage of personal incomes allocated to education. It does not mean, of course, that effective controls cannot be sought for the component elements of educational costs.

With regard to the level of provincial government revenues, the Alberta Department of the Treasury estimates, on the basis of growth assumptions made by the author, that total tax and non-tax revenues will approach $9,000,000,000 by 2005. What can be expected throughout the forecast period is that the provincial government will be under increased pressure from local governments to increase its share of educational spending. This will result primarily from the inability of an essentially regressive local government tax structure to keep pace with the demand for public services, given the continued growth in income and continued migration to urban areas. If by 2005 ,this results in an increase in provincial government spending on education from 7 to, say, 8 per cent of personal income, and if local government contributions decline to about 4 per cent, the following figures would apply:

Provincial Government (37.6% of revenues)	$3,364,320,000
Local Governments	$1,682,150,000
Total from two sources	$5,746,400,000

This would leave a significant gap of $1,886,104,728 based on the $6,932,584,728 discussed above. The gap would not yield to federal government contributions and other income sources based on their percentage contributions of 1968.

If, however, the federal government in 2005 were to share post-secondary operating costs on a 50 per cent basis, the sum of $1,417,255,576 would be forthcoming to help finance total educational costs. This is an indication of the importance of federal cost-sharing arrangements to provincial and local governments and Alberta citizens.

It is also possible, of course, that the province will want to give careful consideration to the possibility of requiring students to meet a larger share of their educational costs at the post-secondary level. This decision might be justified by the significant increases in lifetime earnings generated by post-secondary education, but it would require some kind of student loan fund to guard against the possibility of discrimination against low- and middle-income groups in gaining access to post-secondary education.

CHAPTER ONE

ALBERTA'S POPULATION — 1980 AND 2005

The primary objectives of this chapter are to estimate the distribution of provincial residents by geographic location, age and sex by 1980 and 2005.

The size and composition of Alberta's population for these years will be determined by fertility and morality rates and patterns of net migration into the province. The projections developed in this chapter were made by the Alberta Oil and Gas Conservation Board (O & GCB) in 1970.[1] The decision to use the O & GCB projections was based on the methods used by the Board, particularly the fact that the Board's projections isolate age-specific fertility rates as the most important single determinant of changes in population size. The other principal variable built into the Board's projections is net migration of about 11,000 persons per year during the forecast period. This represents a continuation of the migration inflow that began about 1956, was interrupted from 1961 to 1965, and was reasserted between 1966 and 1969.

Mortality rates, the final variable of population change, recognize the decreased infant and over-70 mortality rates and the increased mortality rates of the 20-24 age group in recent years. These changes are projected to continue until 1981 and are held constant thereafter. The assumed mortality rate of about 6 per 1,000 population per year does not introduce a substantial source of error into the population forecasts.

The most important assumptions included in the Board's projections of fertility rates are (1) recognition of a significant decline in fertility rates beginning about 1961, (2) continuation of this decline at a reduced rate from 1971 to 1981, and (3) constant fertility patterns after 1981.

The other methodological note that requires mention is the fact that the basic model used by the Board projected population to 1999. This model was extended by the Board to the year 2005 to meet the specific requirements of this study.

Population Totals, 1980 and 2005

Table I-1 presents time series and projected population figures for the total province and its census divisions from 1951 to 2005. Using 1970 as the base year, provincial population is expected to grow from 1,588,498 to 1,957,736 in 1980, and increase of about 23 per cent. From 1970 to 2005, the population is expected to double in size to more than 3 million in the latter year. Over the 35-year projection period, the annual rate of population growth is about 1.9 per cent. Provincial population is expected to reach 2 million in 1981.

Between 1970 and 1980, 10 census divisions are expected to experience an absolute increase in population size (Census Divisions 1, 2, 6, 7, 8, 9, 11, 12, 14 and 15 — see Figure I-1). Simultaneously, Census Divisions 3, 4, 5, 10, and 13 are expected to experience some decline in absolute numbers of residents. Despite the absolute population increase anticipated in 10 census divisions between 1970 and 1980, census division population as a percentage of total population declines in 9 census divisions (1, 2, 3, 4, 5, 7, 8, 10 and 13), remains constant in one (9) and increases in only 5 (6, 11, 12, 14, and 15 — see Figure I-2.) Furthermore, the increase in population growth in both absolute and percentage terms is centered in the Calgary (6) and Edmonton (11) Census Divisions.

Between 1980 and 2005, continued growth in the number of residents is projected in all but one of those census divisions expected to experience a population increase during the previous ten-year period. Only Census Division 7 of the previous growth areas is expected to experience a decline in number of residents. Thus, six Census Divisions can expect a decline in population levels from 1980 to 2005 (see Figure I-3). Moreover, from 1980 to 2005 only Census Divisions 6, 11, 14, and 15 are expected to experience an increase in population as a percentage of the total provincial population (see Figure I-4). Again, the principal increases in both absolute and percentage terms will occur in the Calgary and Edmonton census divisions.

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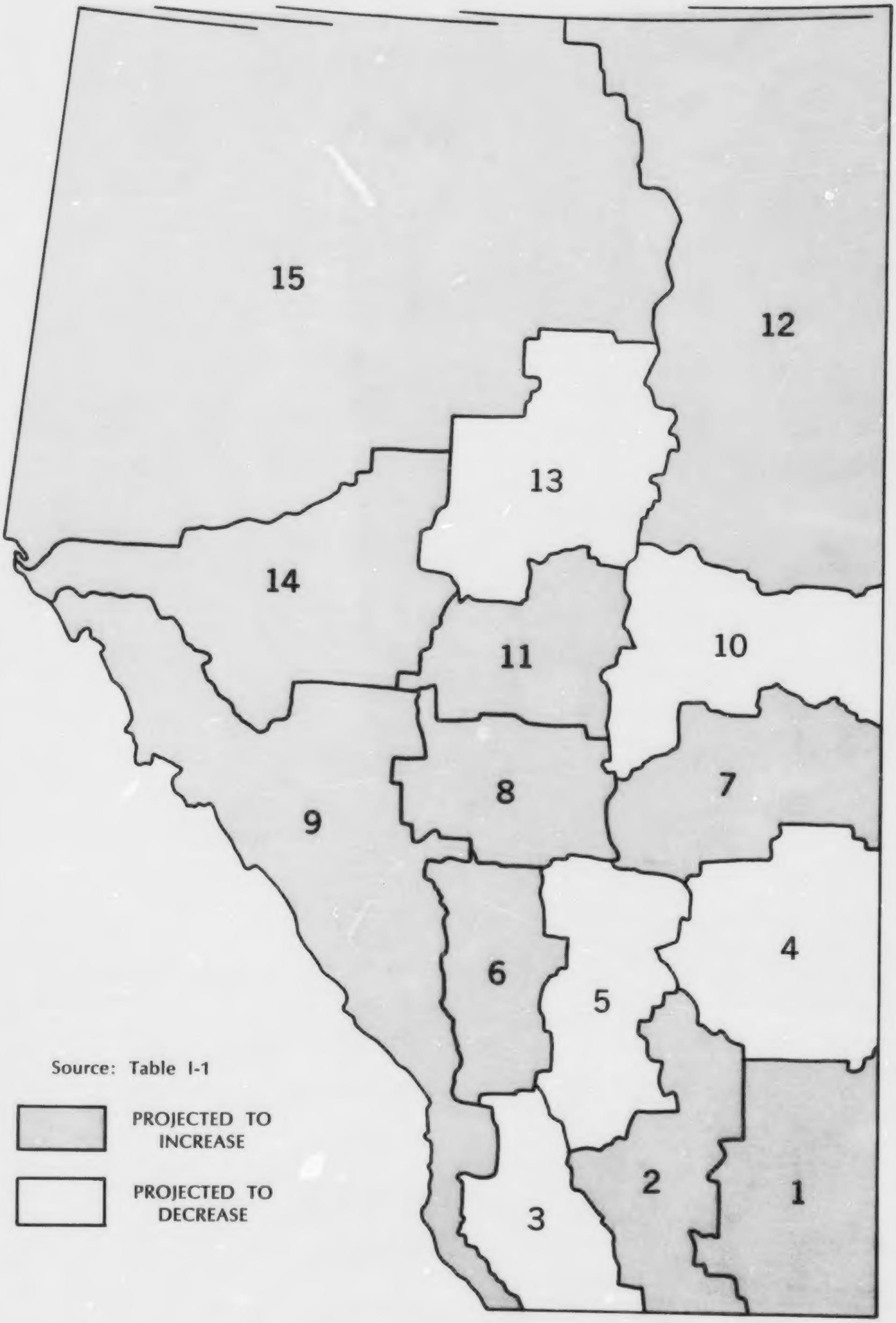
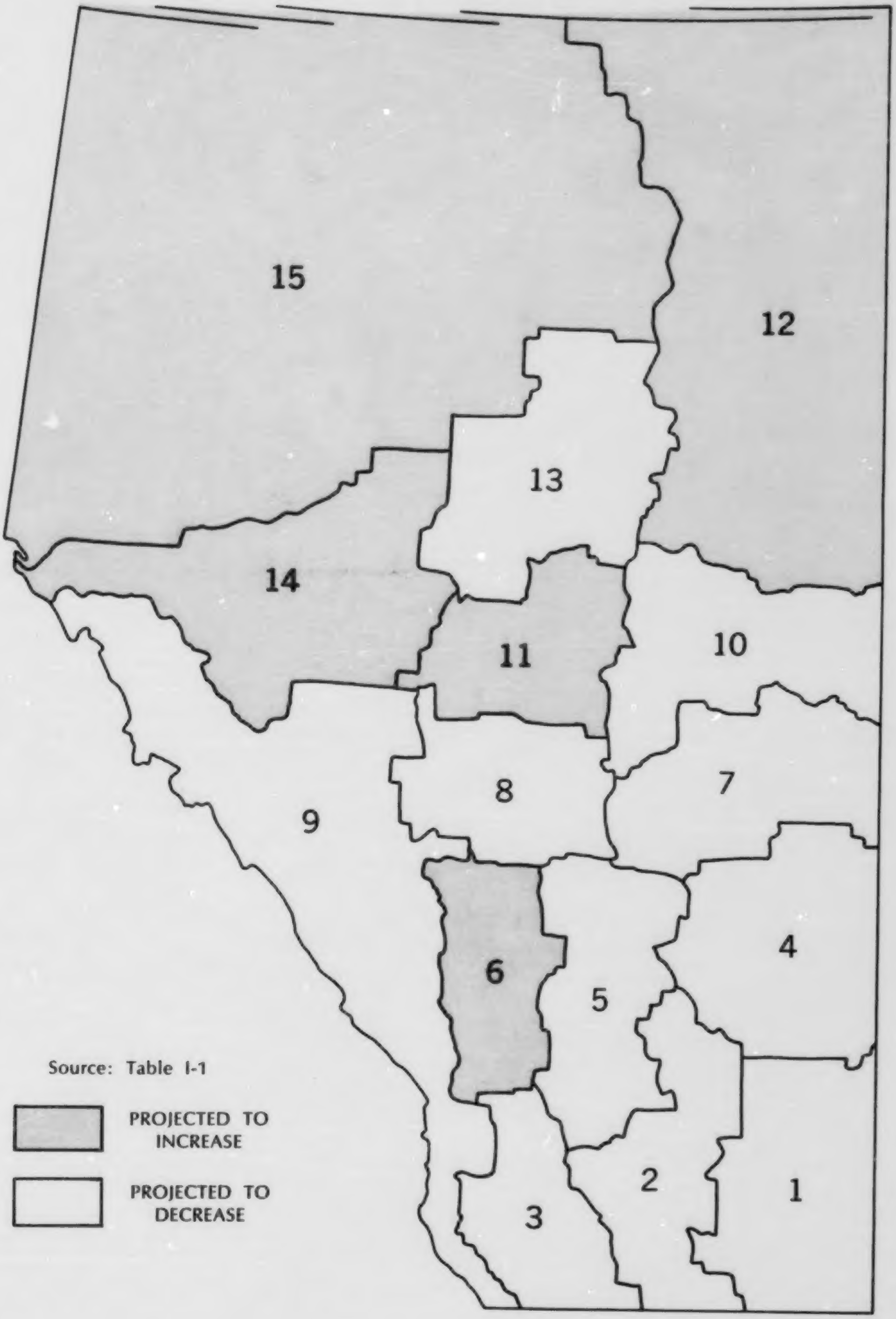
[1] Alberta Oil and Gas Conservation Board, Submission of the Staff of the Oil and Gas Conservation Board, in the Matter of the Gas Resources Preservation Act 1956, June, 1970.

FIGURE I-1: PROJECTED CHANGES IN POPULATION BY CENSUS DIVISION 1970 TO 1980



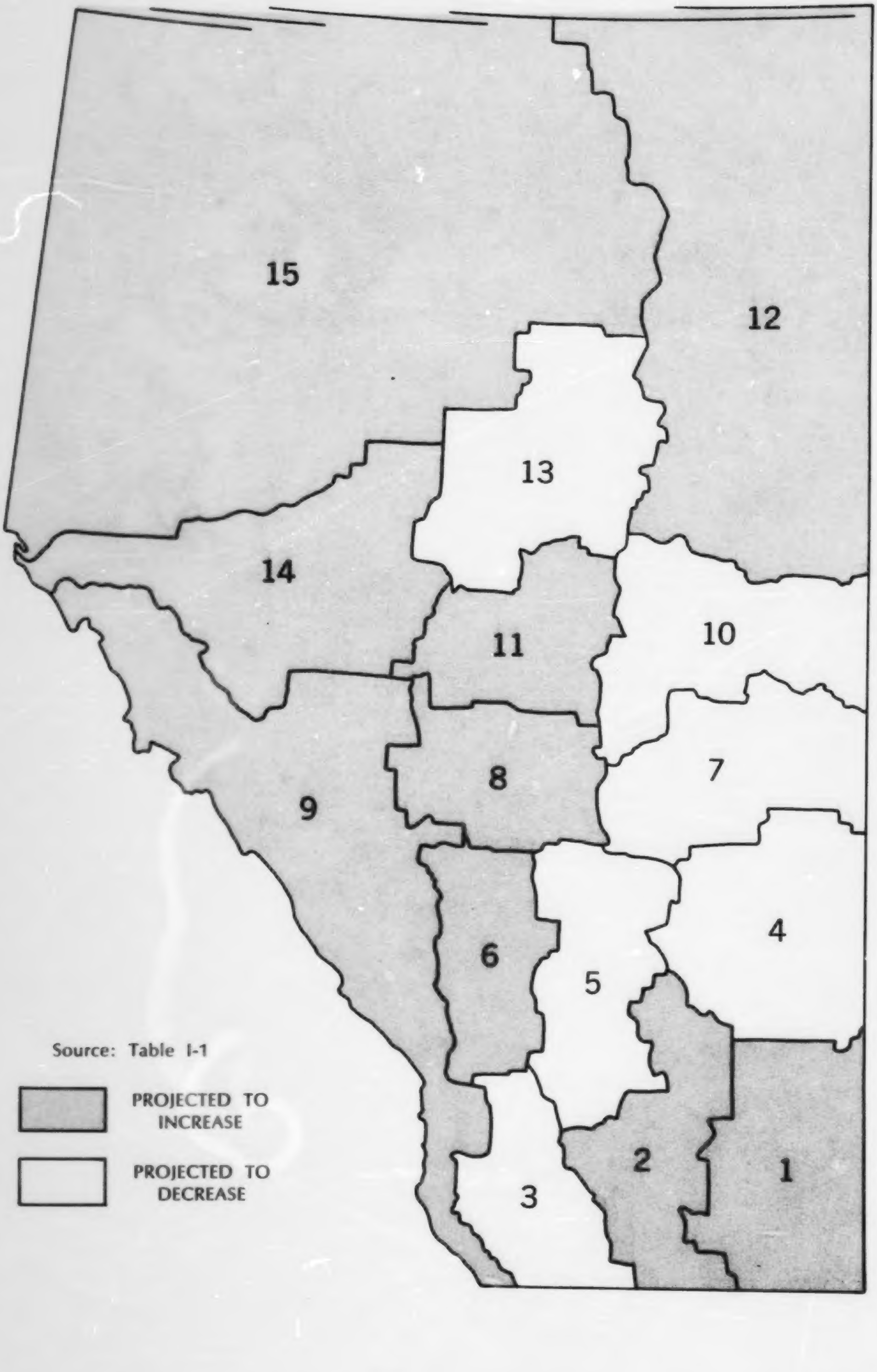
Source: Table I-1

FIGURE I-2: PROJECTED CHANGES IN PERCENTAGE SHARES OF PROVINCIAL POPULATION BY CENSUS DIVISION 1970 TO 1980



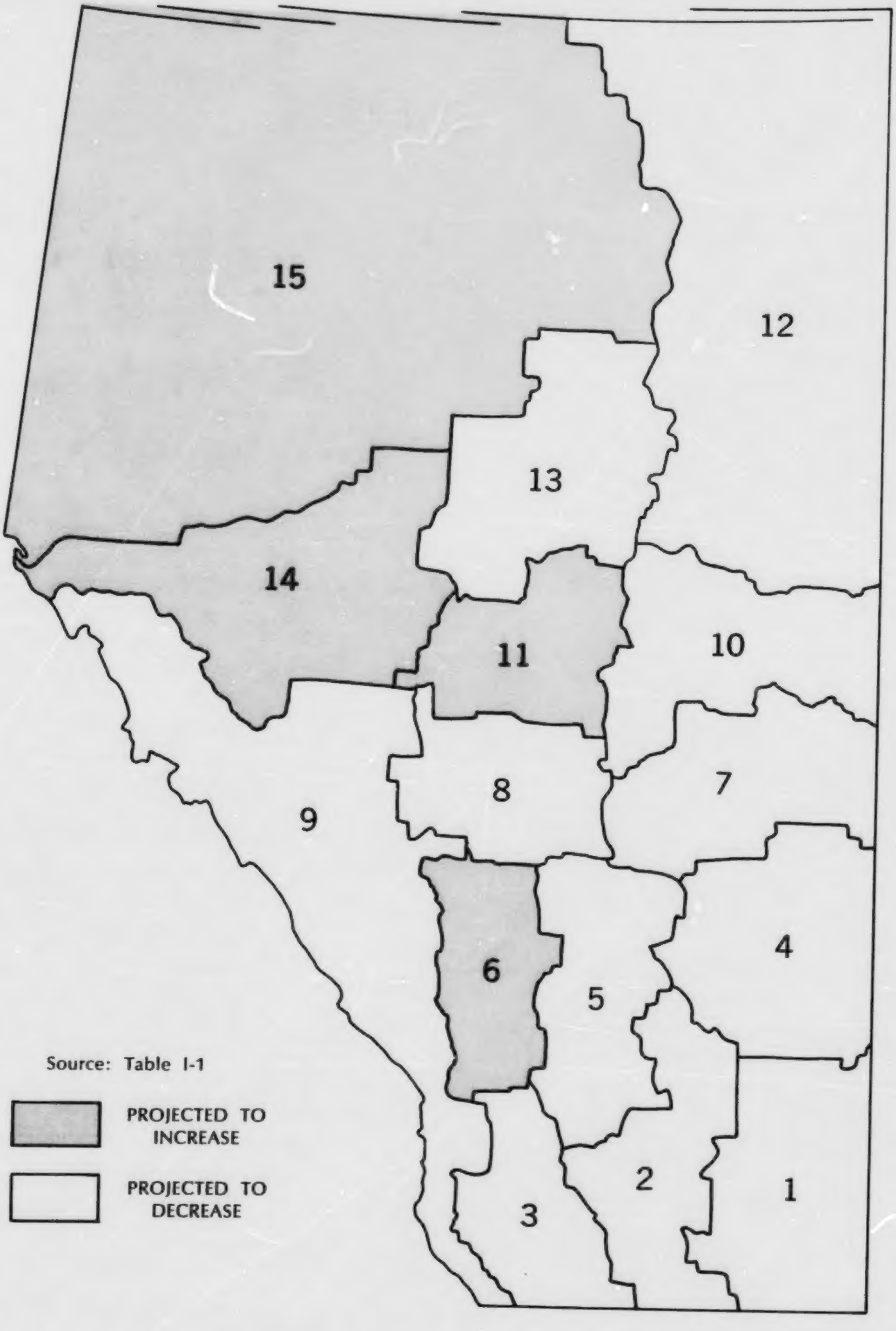
Source: Table I-1

FIGURE I-3: PROJECTED CHANGES IN PERCENTAGE SHARES OF PROVINCIAL POPULATION BY CENSUS DIVISION 1980 TO 2005



Source: Table I-1

FIGURE I-4: PROJECTED CHANGES IN PERCENTAGE SHARES OF PROVINCIAL POPULATION BY CENSUS DIVISION 1980 TO 2005



Source: Table I-1

While geographic distribution of population is a primary concern of this study, census divisions are too numerous to lend themselves to further analysis. Accordingly, census divisions have been merged into six geographic divisions for further analysis of the spatial characteristics of the provincial population. An analysis of regional population is provided in conjunction with Tables I-8 through I-13.

Age Distribution of Provincial Population

Table I-2 provides data on the age distribution of the provincial populaiton. From 1956 to 1970, the age group with the most significant implications for enrolments in educational institutions, the 24 and under group, increased from 47.6 per cent of the provincial population to 50.6 per cent. After 1970, however, this percentage is expected to decline. Between 1970 and 1980, the 0-24 age group is expected to decline to 47.1 per cent of the provincial population. By 2005 the continuing downward trend is expected to lower the 0-24 age group to about 42.8 per cent of the provincial population (see Figure I-5).

While the decrease in the 0-24 age group as a percentage of the total population does not imply an absolute decline in 0-24 population size, it does mean that the increase in this age group is relatively modest. From 1970 to 1980, the 0-24 age group increases from 803,489 to 923,738. This increase (120,249) represents a percentage rise of 15 per cent compared to total population growth of about 23 per cent. Between 1980 and 2005, the 0-24 age group grows to 1,298,759. This represents a further growth of 375,021 in the 0-24 age group, or about 15,000 per year during the 25-year period.

Within the 0-24 age group, changes between 1970 and 1980 will have significant implications for enrolment and educational policy. During the 1970's, the elementary school age group, 5-11, not only falls from 16 per cent of the provincial population to 12.2 per cent, but it experiences an absolute decline from 254,820 to 239,769 (227,677 in 1975). The secondary school age group, 12-17, declines during the same period from 12.8 to 10.6 per cent of the provincial population. The 12-17 age group grows from 202.672 in 1970 to 230,405 in 1975, but then falls to 206.952 in 1980. Thus, the elementary and secondary school age population will decline between 1970 and 1980 from 457,492 to 446.721, after remaining nearly constant from 1970 to 1975.

The elementary school age group, 5-11, increases by more than 80,000 or by more than 8,000 per year from 1980 to 1990, but by less than 3,000 per year thereafter until 2005. As a percentage of the total provincial population, the 5-11 age group remains virtually constant from 1980 to 2005.

The secondary school age group, 12-17, falls by 4,000 from 1980 to 1985 and then grows by about 5,000 per year for the next 20 years. As with the 5-11 cohort, the 12-17 age group remains virtually constant as a percentage of the provincial population from 1980 to 2005.

From 1970 to 1980, the post-secondary education age group, 18-24, grows about 8,000 per year, from 193,131 or 12.2 per cent of provincial totals to 272,656 or about 14 per cent. From 1980 to 1990, however, this age group experiences a sharp decline to 245,890 or just 10.3 per cent of the provincial population. Thereafter, it resumes a rapid growth rate, increasing to 351,683 by 2005, an increase of about 6,500 per year. Over the 1980 to 2005 period, the 18-24 age group falls from about 14 to about 11.6 per cent of the provincial population.

Finally, the 0-4 group grows at a fairly consistent rate, from 1970 to 2005, remaining between 9 and 10 per cent of the provincial population.

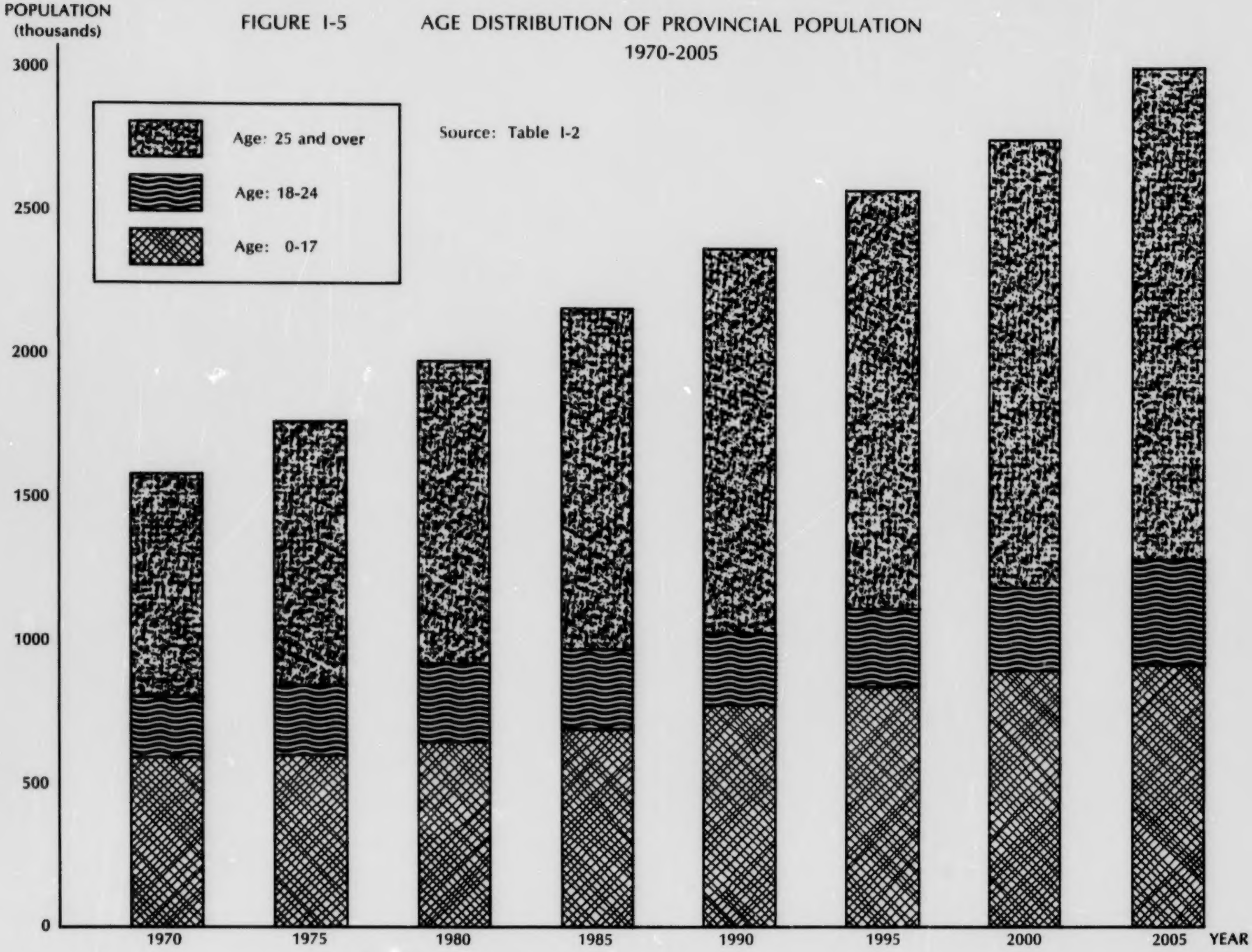
Table I-3 shows the projected population distribution in 1980 and 2005 by 5- and 7-year age intervals, with an open-ended 65-and-over cohort.

Sex Distribution of Provincial Population

Between 1956 and 1970, male population as a percentage of the provincial population declined from 52.2 to 50.6. From 1970 to 1980 this decline will continue, but at a decreased rate (see Table I-4). Males in 1980 are expected to constitute 50.1 per cent of the provincial population. Between 1980 and 1985, males will become less numerous in Alberta than females and by 2005 will represent 49.5 per cent of the provincial population.

The most visible characteristic of sex distribution during the forecast period is the remarkable similarity in numbers of males and females. In 1980, males will total 980,062 while females will total 977,674. By 2005, males will number 1,501,116 and females 1,530,055. Males, however, will continue to

FIGURE I-5 AGE DISTRIBUTION OF PROVINCIAL POPULATION
1970-2005



Source: Table I-2

outnumber females in the 0-24 age group. The greatest variation in age groups between the sexes will occur in 2005, when 27.7 per cent of the over-24 age group will be male, 29.4 per cent female. Very similar distributions remain the salient characteristic of male-female percentages of other age groups throughout the forecast period.

Rural to Urban Migration in Alberta

As shown in Tables I-5 and I-6, the transition in nature of Alberta's population from rural to urban will be substantially accomplished by 1980. In 1951, persons living in urban places of 1,000 or more people accounted for less than half the provincial population. By 1980, however, it is estimated that about 80 per cent of Alberta's people will live in places of 1,000 or more persons. While data are not available for 2005, an analysis of Table I-5 suggests that the 90 per cent of provincial population expected to reside in urban places by 1999 will be slightly extended by 2005. Given existing trends, more than 2,728,054 persons are expected to live in urban places in Alberta by 2005. It is quite likely that fewer than 300,000 persons out of a population of more than 3,000,000 will reside in rural places by 2005 (see Figure I-6).

In 1951, 11 of the 15 census divisions had a majority of their population residing in rural places. By 1980, only 7 census divisions are likely to have a majority of persons living in rural places. By 2005, only Census Divisions 4, 5, and 13 are expected to have more persons living in rural than in urban places, and at least 8 of the 15 census divisions may expect more than 75 per cent of their populations to reside in urban places. The Edmonton and Calgary census divisions will have more than 92 and 95 per cent of their people concentrated in urban places in 1980. By 2005, the percentages will probably have increased to more than 96 and 98 per cent, respectively.

The Increasing Dominance of Edmonton and Calgary

Urban places are defined as cities and towns with more than 1,000 residents. This census definition of urban places, therefore, might still contemplate a population characterized by concentration in small towns. Tables I-7 and I-8 suggest that this is clearly not in Alberta's future, given existing concentration characteristics and trends.

By 1956, the Edmonton and Calgary census divisions already accounted for nearly half the provincial population. Moreover, by 2005, when both regions will have grown to more than 1,000,000 people, they will account for more than 70 per cent of the provincial population (see Figure I-7).

Table I-7 indicates that the concentration of population in Edmonton and Calgary will be reflected evenly throughout all age groups. In 1980, the two regions will account for more than 61 per cent of all age groups, and by 2005 for about 70 per cent of all groups.

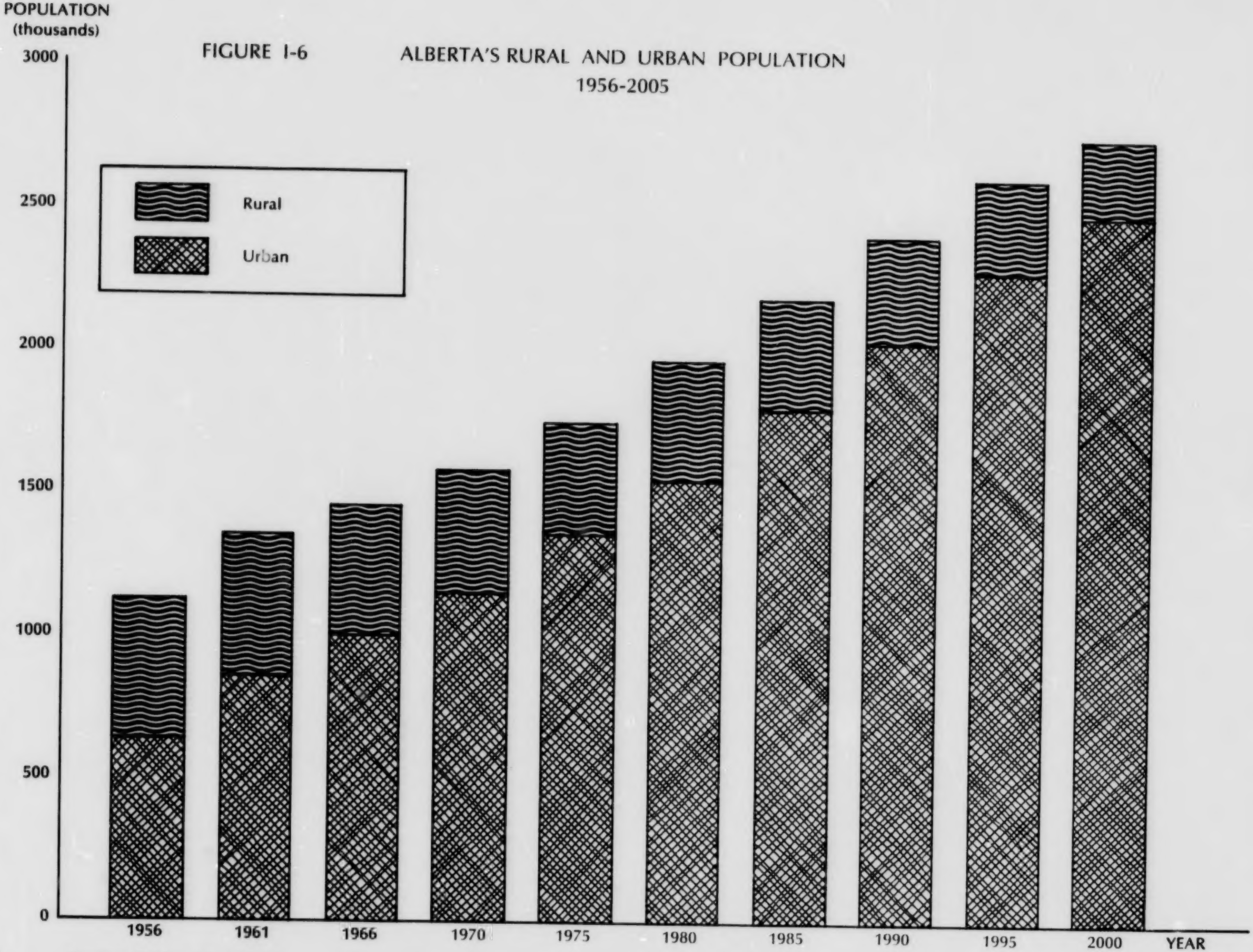
These data do not imply that the numbers of people living outside the Edmonton and Calgary regions will decrease. On the contrary, as shown in Table I-8, population outside the two major metropolitan centers is expected to grow from 561,691 in 1956 to 718,656 in 1980. By 2005, population outside Edmonton and Calgary should number more than 900,000. At the same time, however, the higher population growth rates in Edmonton and Calgary indicate that the percentage of the provincial population living outside these growth centers will decline from slightly more than 50 per cent in 1956 to less than 37 per cent in 1980 and to less than 30 per cent in 2005.

Alberta's Geographic Regions

To analyze population characteristics for areas larger than census divisions, six regions have been defined by combining census divisions along strictly geographic lines.

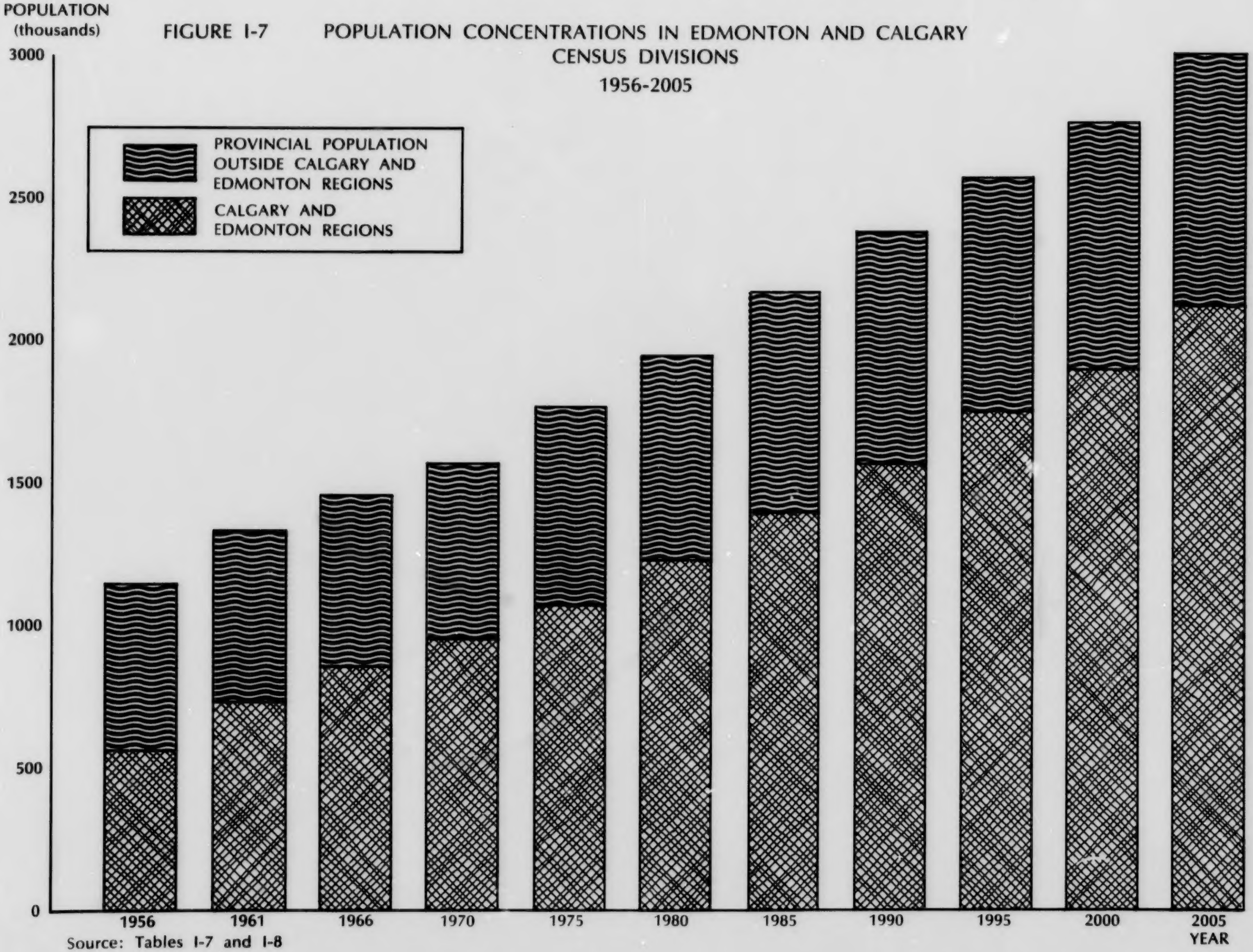
The Southern Region is comprised of the three southern-most census divisions; the Northern Region of the three northern-most census divisions; the Central Region of all central census divisions lying between the Southern and Northern Regions, except for Census Divisions 9 and 14 which comprise the Mountain Region, and the Edmonton and Calgary census divisions, each of which comprises a separate geographic region as defined here. For the Edmonton and Calgary census divisions, population concentrations suggest recognition as separate regions, rather than geographic considerations (see Figure I-8).

FIGURE I-6 ALBERTA'S RURAL AND URBAN POPULATION 1956-2005



Source: Tables I-5 and I-6

FIGURE I-7 POPULATION CONCENTRATIONS IN EDMONTON AND CALGARY CENSUS DIVISIONS 1956-2005



Source: Tables I-7 and I-8

The Southern Region

The Southern Region includes Census Divisions 1, 2, and 3, and the cities of Medicine Hat, Lethbridge, and Pincher Creek. In 1970 it is estimated that the Southern Region has a population total of more than 154,000, which is expected to increase to about 165,000 by 1980 and 189,000 by 2005. As a percentage of the provincial population, the Southern Region is expected to decline from 9.7 per cent in 1970 to 8.4 per cent in 1980. By 2005, a further decline to 6.2 per cent of the provincial population is expected. (see Table I-9).

Within the region, Census Division 1 is expected to remain virtually constant in population, edging up to 40,466 in 1980, some 1,500 more than in 1970. By 2005 a further small increase to 40,666 is projected. This represents a decline from 2.5 to 2.1 to 1.3 as a percentage of the provincial population from 1970 to 1980 and 2005. Census Division 2, on the other hand, should become the growth cone of the Southern Region, as the University of Lethbridge induces continued urbanization within the division. Population is expected to increase from 85,386 in 1970 to 94,906 in 1980 and 123,348 in 2005. Despite this growth, the division will fall from 5.4 in 1970 to 4.8 in 1980 to 4.1 in 2005 as a percentage of the provincial population. Census Division 3 is expected to experience an absolute decline in population from 30,281 in 1970 to 29,727 in 1980. The continuing decline is expected to be reflected in a population level of 25,044 by 2005. This represents a decrease from 1.9 to 1.5 to 0.8 per cent of the provincial population.

The Central Region

The Central Region of Alberta is the area south and east of Edmonton and north and east of Calgary. It encompasses Census Divisions 4, 5, 7, 8, and 10, and includes the cities of Red Deer, Drumheller, Camrose, Stettler, and Hanna.

From 1956 to 1970, the Central Region population grew at a rate of less than 1 per cent per year to reach an estimated total of 250,207. This modest growth rate is expected to continue. The region's population should approximate 266,123 in 1980 and 296,035 in 2005. Because of the relatively minor increases projected, the Central Region's share of the provincial population will decline from 15.8 per cent in 1970 to 13.6 per cent in 1980 and 9.8 per cent in 2005 (see Table I-10). By 2005, only the over-25 age group will represent as much as 10 per cent of the total age group population in the Province. In 1980, most age groups will correspond closely to 13.6 per cent of the provincial population. The exception is the post-secondary school age group (18-24), which is expected to represent only 12.4 per cent of the provincial 18-24 age group.

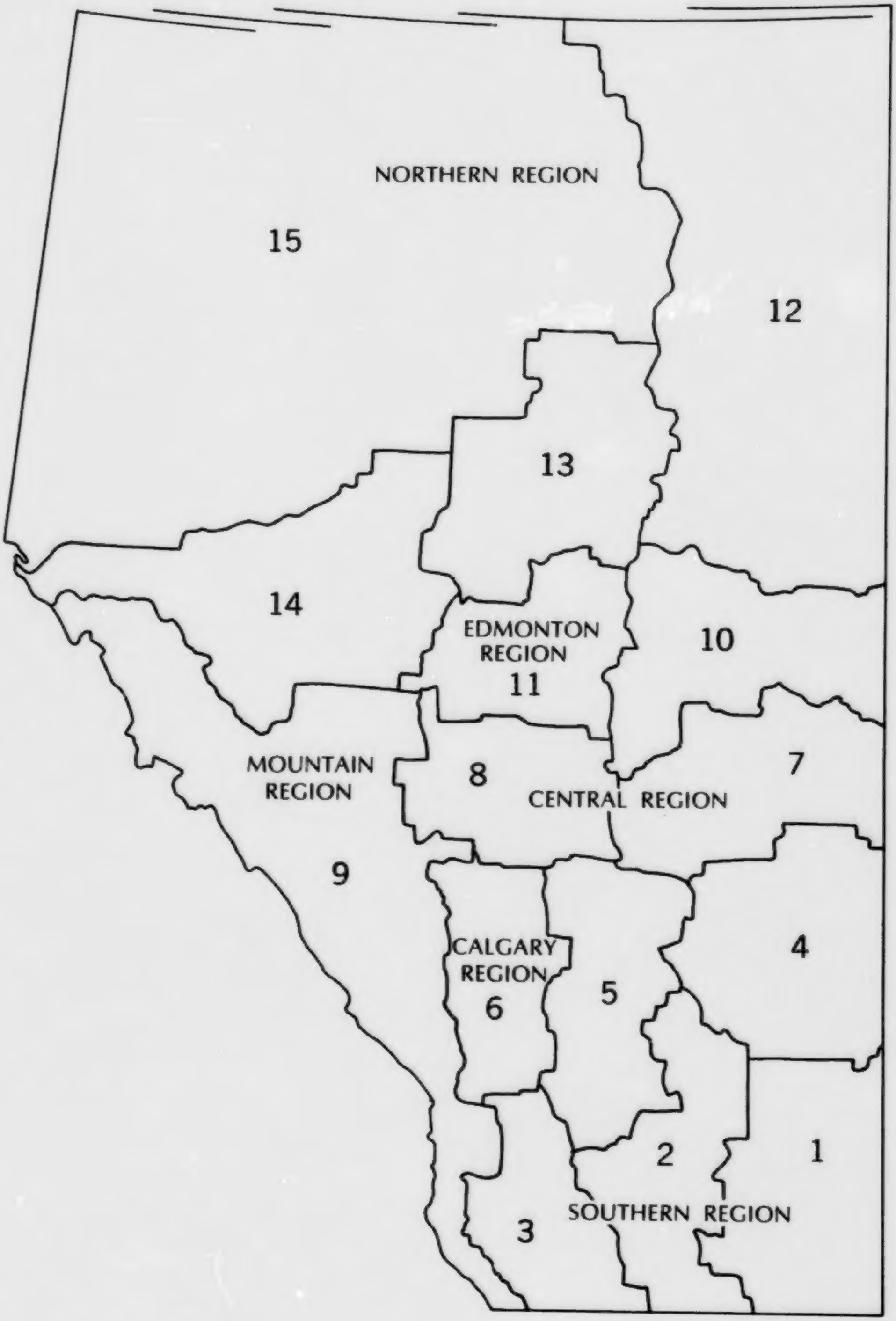
The changes within the Central Region are analogous to the changes within the province. Three of the census divisions within the region (4, 5, and 10) are expected to experience a decline in population by 1980, while Census Division 7 maintains a stable population. Thus, Census Division 8 will account for all the population growth in the region. From 1970 to 1980 and 2005, the population of the Central Region will decline outside Census Division 8. The growth in the Census Division 8 population of about 18,000 from 1970 to 1980 and about 54,000 from 1980 to 2005 will increase its percentage share of the total Central Region population from 35 per cent in 1970 to 40 per cent in 1980, and 54 per cent in 2005.

The census divisions in the Central Region are in fairly close proximity to the Calgary and Edmonton regions and a large part of the population decline in these census divisions is explained by emigration to the province's two major urban centres. At the same time, it is expected that various economic and social conditions will also make Census Division 8 and the city of Red Deer increasingly attractive and that the net migration to Census Division 8, discussed above, will occur accordingly.

The Northern Region

By far the largest of the geographic regions, the Northern Region encompasses Census Division 12, 13, and 15. The development of strategic mineral deposits in the Northern Region is expected to have a substantial effect on its population during the forecast period. From 1956 to 1970, the region's population increased by a healthy 54,000, or more than 33 per cent. A relatively high growth rate is expected to continue, with the Region's population expected to total nearly 236,000 in 1980, and to more than 337,000 in 2005 (see Table I-11).

FIGURE 1-8 GEOGRAPHIC REGIONS OF ALBERTA



Population growth in the Northern Region does not suggest a significant increase in population density, given the massive area included in the region. Nor does it increase the region's population as a percentage of the provincial population. Despite the growth in absolute numbers of residents, the Region will account for only about 12 per cent of the provincial population in 1980, compared to 14.3 per cent in 1956. By 2005, the Northern Region is expected to represent about 11 per cent of Alberta's total population.

In 1970, the 5-11 and 12-17 age groups in the Northern Region represented a larger percentage of the provincial population in those age groups than did the Northern Region's total population as a percentage of provincial totals. This differential is expected to decline gradually over the forecast period, and by 2005 the 5-11 and 12-17 age groups will be more closely aligned with the rest of the population in the Region. At the same time, the large excess of male over female population of 1970 is expected to decline consistently. Thus, by 2005, males are expected to outnumber females by only about 2,000.

The population growth projected for the Northern Region will centre in Census Divisions 12 and 15, with Fort McMurray and Grande Prairie among the growing urban centres. Net migration to both areas is expected to continue as mineral activity provides the impetus for growing industrial and employment opportunities. Census Division 13, on the other hand, is expected to experience a continuation of the population decline characteristic of the area since 1956.

As Census Divisions 12 and 15 double their populations by 2005, they will both represent a slightly larger percentage of the provincial population than they did in 1970.

The Mountain Region

The Mountain Region includes Census Divisions 9 and 14, and the cities of Hinton, Jasper, and Banff. While the region has tended to lose population during the last two decades, some modest increase in population is projected as a result of coal, pulp and paper, and tourist developments.

The region has the smallest population of the six regions. As its population grows from about 41,000 residents in 1970 to about 51,000 in 1980, and 80,000 in 2005, it will still constitute less than 3 per cent of the provincial population (see Table 1-12). The region is characterized by a relatively even relationship among age groups as a percentage of the provincial population. Similarly, the numbers of males and females in the region will tend to equalize during the forecast period, as the male surplus of 2,000 in 1970 is reduced to less than 1,000 by 2005.

Both census divisions will experience the small population growth projected for the region, as tourism and industrial development exert modest growth pressures in both areas.

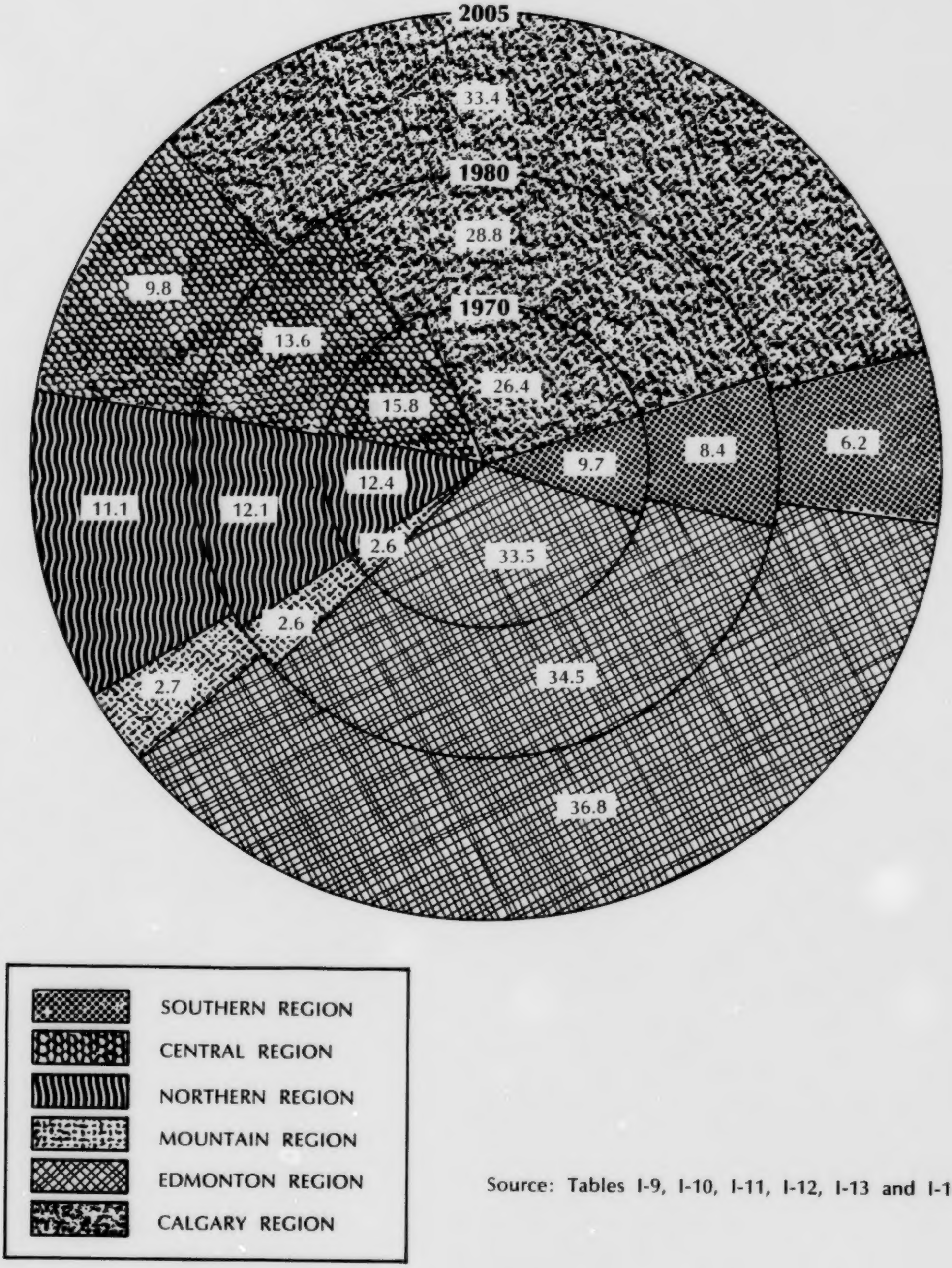
The Edmonton Region

The Edmonton Region, consisting of Census Division 11, is predominantly a metropolitan district dominated by the provincial capitol, the city of Edmonton. This region accounts for about one-third of the provincial population in 1970, some 526,460, an increase of more than 200,000 people from the 1956 figures, when the region included about 29 per cent of the provincial total.

As continued migration to the Edmonton Region occurs, its population is likely to continue to grow at the rapid rate of about 2.3 per cent per year. Thus, by 1980, the region should number 675,576 people, about 34.5 per cent of Alberta's total. By 2005, the Edmonton Region will include more than 1,100,000 persons within its geographic area, nearly 37 per cent of the provincial population (see Table I-13).

By 1980, the region will include 355,500 persons in the over-25 age group and another 320,000 in the under-25 categories. Its school age population will run consistently between 34 and 35 per cent of Alberta's total population. By 2005, between 36 and 37 per cent of Alberta's school age population will reside in the Edmonton Region. By 1980, the female population in the region will slightly outnumber its male counterpart, as will be the case in 2005. Again, however, the distribution of total population between the sexes runs an even course throughout the period in the region as it does in the province. For example, in 1980 females will constitute 50.1 per cent of the regional population, males 49.9 per cent.

FIGURE I-9 LOCATION OF PROVINCIAL POPULATION BY REGIONS
1970, 1980, and 2005



Source: Tables I-9, I-10, I-11, I-12, I-13 and I-14

The Calgary Region

In recent years, the Calgary Region — Census Division 6 — has become the most rapidly growing urban center in the province. From 1956 to 1970, the regional population grew from 237,886 to an estimated 419,038. This increase of about 76 per cent increased from 21 to 26 the percentage of the provincial population in the Calgary Region. Moreover, the region is expected to continue to have the highest population growth rate in the province, about 2.7 per cent per year during the forecast period. By 1980 the region is expected to have some 536,500 residents, nearly 29 per cent of the provincial population. The region's share of Alberta's school age population will range from 27.7 per cent of the 12-17 age group to 28.9 per cent of the 5-11 age group. In 1980, the female population will exceed the male population in the region by about 10,000 (see Table I-14).

The Calgary Region will be the second urban centre with more than 1,000,000 persons by 2005. The projected 1,011,196 population level will represent 33.4 per cent of the total population in the province, evenly distributed throughout all age groups. Females will comprise about 51 per cent of the total, males about 49 per cent.

Religious Characteristics of Alberta's Population

Table I-15 shows the distribution of the provincial population by religious preference for the latest available census year, 1961. The Anglican Church of Canada, the United Church of Canada, and the Roman Catholic Church represent the religious preferences of nearly two-thirds of Alberta's people. Membership in the United Church of Canada alone constituted nearly one-third of the provincial population in 1961. Table I-15 lists all denominations with memberships of more than 25,000 persons in 1961.

Data on religious denominations from 1961 census are already 10 years old. The following incomplete estimates on current religious affiliation were obtained from various religious organizations and individuals in an effort to shed more recent light on religious preferences of Alberta's population. No trend or other statistical analysis is possible because of the very partial and limited nature of the more recent estimates.

Roman Catholic, 1970 estimate:

Calgary Diocese	111,000
Edmonton Diocese	136,000
St. Paul Diocese	38,000
McLennan Diocese	31,000
Total	316,000

United Church of Canada, 1970 estimate:

Calgary Presbytery	49,000
Coronation Presbytery	21,300
Edmonton Centre Presbytery	21,300
Edmonton North Presbytery	28,900
Edmonton South Presbytery	29,500
Foothills Presbytery	16,000
Peace River Presbytery	18,000
Red Deer Presbytery	21,200
St. Paul Presbytery	15,500
Southern Alberta Presbytery	24,900
Total	245,600

Anglican Church	no figures made available
Lutheran Church, 1969 estimate	56,747
Presbyterian Church, 1969 estimate	12,000

Baptist Church — incomplete estimates by various conferences suggest about 14,000 members, not including Southern Conference and Fellowship Conference.

Greek Orthodox Church ..... no aggregate figures available

Mormon Church:

January 1st, 1970	25,975
Expected as of January 1, 1971	26,524

Regional Concentration of Selected Ethnic Groups

Table I-16 shows the size and regional concentration of French, Indian, and Eskimo populations in 1961, the latest available census year. The French population of more than 83,000 was located primarily in the Northern and Edmonton Regions, with smaller numbers in the Calgary Region.

The Indian and Eskimo population of more than 28,000 had half that number in the Northern Region. All other regions save the Mountain and Calgary Regions had significant concentrations of Indians and Eskimos.

Efforts to obtain information on French and Metis population in Alberta more recent than the 1961 census data have been unavailing. Contacts with the respective ethnic associations were unproductive of current estimates of population size. With regard to Indian and Eskimo population, the Department of Indian Affairs in Edmonton reports that there were 28,234 treaty Indians in Alberta as of December, 1969.

TABLE I-1

ALBERTA'S POPULATION — TOTAL AND BY CENSUS DIVISIONS — 1951 - 2005[1]

Census Division	1951*	% of Total	1956*	% of Total	1961*	% of Total	1966*	% of Total	1970†	% of Total	1975†	% of Total
1	28,317	3.0	34,496	3.1	39,140	2.9	38,858	2.7	38,982	2.5	39,602	2.2
2	67,694	7.2	74,991	6.7	83,306	6.3	82,719	5.7	85,386	5.4	89,459	5.1
3	27,667	2.9	30,426	2.7	30,967	2.3	29,592	2.0	30,281	1.9	29,908	1.7
4	13,182	1.4	14,294	1.3	15,020	1.1	14,224	1.0	14,210	0.9	13,912	0.8
5	39,055	4.2	38,120	3.4	38,115	2.9	35,987	2.5	36,454	2.3	35,822	2.0
6	177,441	18.9	237,886	21.2	317,989	23.9	369,140	25.2	419,038	26.4	486,890	27.6
7	40,217	4.3	40,214	3.6	40,837	3.1	40,833	2.8	41,480	2.6	41,586	2.3
8	57,513	6.1	64,168	5.7	76,533	5.7	83,912	5.7	87,354	5.5	96,204	5.5
9	19,496	2.1	17,239	1.5	20,274	1.5	18,195	1.2	18,841	1.1	20,467	1.2
10	70,677	7.5	71,500	6.3	70,177	5.3	70,211	4.8	70,802	4.5	69,685	4.0
11	235,475	25.1	323,539	28.8	410,679	30.8	476,053	32.5	526,460	33.1	596,586	33.9
12	39,886	4.2	44,947	4.0	47,310	3.6	50,635	3.5	57,384	3.6	63,879	3.6
13	46,638	5.0	45,033	4.0	45,431	3.4	44,142	3.0	44,678	2.8	43,738	2.5
14	14,433	1.5	15,846	1.4	19,282	1.4	20,358	1.4	21,949	1.4	25,278	1.5
15	61,800	6.6	70,417	6.3	76,884	5.8	88,344	6.0	95,199	6.0	107,278	6.1
Total	939,501	100.0	1,123,116	100.0	1,331,944	100.0	1,463,203	100.0	1,588,498	100.0	1,760,589	100.0

Census Division	1980+	% of Total	1985+	% of Total	1990+	% of Total	1995+	% of Total	1999+	% of Total	2005+	% of Total
1	40,466	2.1	41,265	1.9	41,600	1.7	41,446	1.6	41,151	1.5	40,666	1.3
2	94,906	4.8	100,981	4.7	106,780	4.5	111,994	4.3	116,210	4.2	123,348	4.1
3	29,727	1.5	29,497	1.4	28,804	1.2	27,671	1.1	26,629	1.0	25,044	0.8
4	13,757	0.7	13,624	0.6	13,350	0.6	12,885	0.5	12,447	0.5	11,776	0.4
5	35,414	1.8	34,908	1.6	33,923	1.4	32,445	1.2	31,112	1.1	29,029	1.0
6	563,504	28.9	647,707	29.8	734,878	30.8	823,221	31.7	895,992	32.4	1,011,196	33.3
7	41,976	2.1	42,350	2.0	42,294	1.8	41,709	1.6	41,077	1.5	40,105	1.4
8	106,314	5.4	117,217	5.3	127,983	5.4	138,498	5.4	147,096	5.3	160,842	5.3
9	22,220	1.1	24,025	1.1	25,799	1.1	27,552	1.1	29,031	1.1	31,397	1.0
10	68,662	3.5	67,307	3.1	65,077	2.7	61,866	2.4	58,920	2.1	54,283	1.8
11	675,576	34.5	761,541	35.1	848,924	35.5	935,596	36.0	1,006,122	36.4	1,117,164	36.9
12	73,464	3.8	81,813	3.8	90,358	3.8	98,509	3.8	104,983	3.8	115,108	3.8
13	42,947	2.2	41,930	1.9	40,282	1.7	38,048	1.5	36,105	1.3	33,126	1.1
14	29,227	1.5	33,062	1.5	37,004	1.6	40,901	1.6	44,051	1.6	48,970	1.6
15	119,576	6.1	133,528	6.2	147,754	6.2	161,370	6.2	172,180	6.2	189,117	6.2
Total	1,957,736	100.0	2,170,755	100.0	2,384,810	100.0	2,593,711	100.0	2,763,106	100.0	3,031,171	100.0

[1] As of June 1 each year

* Actual + Estimated

Sources: Various series, **Census of Canada**; and Alberta Oil and Gas Conservation Board

TABLE I-2

ALBERTA'S POPULATION, TOTAL AND BY AGE GROUPS, 1956-2005[1]

Age Groups	1956*	% of Prov. Total	1961*	% of Prov. Total	1966*	% of Prov. Total
0 - 4	149,697		179,888		173,568	
5 - 9	125,820		159,053		179,540	
10 - 14	97,318	47.6	130,383	49.3	157,658	50.8
15 - 19	79,159		99,004		128,999	
20 - 24	82,842		89,154		102,005	
25 & over	588,280	52.4	674,462	50.7	721,433	49.2
TOTAL	1,123,116	100.0	1,331,944	100.0	1,463,203	100.0

Age Groups[2]	1970+	% of Prov. Total	1975+	% of Prov. Total
0 - 4	152,866	9.6	172,046	9.8
5 - 11	254,820	16.0	227,677	12.9
		50.6		49.4
12 - 17	202,672	12.8	230,405	13.1
18 - 24	193,131	12.2	239,778	13.6
25 & over	785,009	49.4	890,683	50.6
TOTAL	1,588,498	100.0	1,760,589	100.0

Age Groups[2]	1980+	% of Prov. Total	1985+	% of Prov. Total	1990+	% of Prov. Total	1995+	% of Prov. Total	1999+	% of Prov. Total	2005+	% of Prov. Total
0 - 4	204,361	10.4	230,275	10.6	240,489	10.1	245,440	9.5	256,002	9.3	282,970	9.3
5 - 11	239,769	12.2	282,018	13.0	320,527	13.4	339,557	13.0	344,981	12.5	363,624	12.0
		47.1		45.2		43.7		43.7		43.6		42.8
12 - 17	206,952	10.6	202,148	9.3	235,915	9.9	271,973	10.5	291,196	10.5	300,482	9.9
18 - 24	272,656	13.9	266,490	12.3	245,890	10.3	277,023	10.7	312,324	11.3	351,683	11.5
25 & over	1,033,998	52.9	1,189,824	54.8	1,341,989	56.3	1,459,718	56.3	1,558,603	56.4	1,732,412	57.2
TOTAL	1,957,736	100.0	2,170,755	100.0	2,384,810	100.0	2,593,711	100.0	2,763,106	100.0	3,031,171	100.0

[1] As of June 1 each year

[2] Note that different age groups are used for estimates than are used for actual census data.

* Actual +Estimated

Sources: Various series, **Census of Canada**; and Alberta Oil and Gas Conservation Board.

TABLE I-3

ALBERTA POPULATION BY AGE GROUP, 1980 and 2005

Age Groups	1980	% of Total	2005	% of Total
0 - 4	204,361	10.4	282,971	9.3
5 - 11	239,769	12.2	363,624	12.0
12 - 17	206,952	10.6	300,482	9.9
18 - 24	272,656	13.9	351,683	11.6
25 - 29	176,134	9.0	232,876	7.7
30 - 34	146,093	7.5	205,640	6.8
35 - 39	113,099	6.8	189,264	6.2
40 - 44	99,443	5.1	213,413	7.0
45 - 49	98,203	5.0	203,546	6.7
50 - 54	93,876	4.8	177,260	5.8
55 - 59	83,127	4.2	140,180	4.6
60 - 64	69,130	3.5	102,162	3.4
65 & over	154,893	7.9	268,071	8.8
TOTAL	1,957,736		3,031,171	

Source: Alberta Oil and Gas Conservation Board.

TABLE I-4

ALBERTA'S POPULATION, TOTAL AND BY SEX AND AGE GROUPS, 1956-2005[1]

Age Group & Sex	1956*	% of Prov. Total	1961*	% of Prov. Total	1966*	% of Prov. Total	1970+	% of Prov. Total	1975+	% of Prov. Total	1980+	% of Prov. Total
0 - 17												
Male	215,850	19.1	272,141	20.4	301,191	20.6	311,869	19.6	321,405	18.3	332,500	17.0
Female	205,892	18.4	259,093	19.5	287,576	19.6	298,489	18.8	308,723	17.5	318,582	16.3
Total	421,742	37.5	531,234	39.9	588,767	40.2	610,358	38.4	630,128	35.8	651,082	33.3
18 - 24												
Male	58,359	5.2	63,121	4.7	75,311	5.2	96,281	6.1	120,278	6.8	136,274	6.9
Female	56,062	5.0	63,127	4.8	77,692	5.3	96,850	6.1	119,500	6.8	136,382	7.0
Total	114,421	10.2	126,248	9.5	153,003	10.5	193,131	12.2	239,778	13.6	272,856	13.9
25 & over												
Male	211,712	27.8	354,121	26.6	369,743	25.3	396,318	24.9	444,049	25.2	511,288	26.1
Female	275,241	24.5	320,341	24.0	351,690	24.0	388,691	24.5	446,634	25.4	522,710	26.7
Total	586,953	52.3	674,462	50.6	721,433	49.3	785,009	49.4	890,683	50.6	1,033,998	52.8
Total Male	585,921	52.2	689,383	51.8	746,245	51.0	804,468	50.6	885,732	50.3	980,062	50.1
Total Female	537,195	47.8	642,561	48.2	716,958	49.0	784,030	49.4	874,857	49.7	977,674	49.9
TOTAL	1,123,116		1,331,944		1,463,203		1,588,498		1,760,589		1,957,736	

Age Group & Sex	1985+	% of Prov. Total	1990+	% of Prov. Total	1995+	% of Prov. Total	1999+	% of Prov. Total	2005+	% of Prov. Total
0 - 17										
Male	364,612	16.8	406,800	17.1	437,483	16.9	455,538	16.5	483,638	16.0
Female	349,829	16.1	390,131	16.3	419,488	16.1	436,631	15.8	463,438	15.3
Total	714,441	32.9	796,931	33.4	856,970	33.0	892,179	32.3	947,076	31.3
18 - 24										
Male	133,456	6.2	123,076	5.2	138,638	5.3	156,652	5.7	176,742	5.8
Female	133,034	6.1	122,814	5.1	138,385	5.4	155,672	5.6	174,941	5.8
Total	266,490	12.3	245,890	10.3	277,023	10.7	312,324	11.3	351,683	11.5
25 & over										
Male	584,660	26.9	656,333	27.5	711,315	27.4	757,698	27.4	840,738	27.7
Female	605,164	27.9	685,656	28.8	748,403	28.9	800,905	29.0	891,674	29.4
Total	1,189,824	54.8	1,341,989	56.3	1,459,718	56.3	1,558,603	56.4	1,732,412	57.2
Total Male	1,082,728	49.9	1,186,209	49.7	1,287,435	49.6	1,369,898	49.6	1,501,116	49.5
Total Female	1,088,027	50.1	1,198,601	50.3	1,306,276	50.4	1,393,208	50.4	1,530,055	50.5
TOTAL	2,170,755		2,384,810		2,593,711		2,763,106		3,031,171	

[1] As of June 1 each year

Sources: Various series, **Census of Canada**; and Alberta Oil and Gas Conservation Board.

* Actual +Estimated

TABLE I-5

ALBERTA'S URBAN POPULATION, TOTAL AND BY CENSUS DIVISION, 1951-2005[1]

Census Division	1951*	% of Total Population of Census Division	1956*	% of Total Population of Census Division	1961*	% of Total Population of Census Division	1966*	% of Total Population of Census Division	1970+	% of Total Population of Census Division	1975+	% of Total Population of Census Division
1	17,902	63.2	23,828	69.1	23,827	71.1	28,875	74.3	29,042	74.5	29,900	75.5
2	29,916	44.2	40,196	53.6	47,186	56.4	50,628	61.2	53,793	63.0	59,222	66.2
3	8,731	31.6	11,299	37.2	12,787	41.3	12,101	40.9	12,930	42.7	13,279	44.4
4	2,027	15.4	2,327	16.3	2,645	17.6	2,633	18.5	3,553	25.0	3,826	27.5
5	7,201	18.4	7,066	18.5	5,732	15.0	6,531	18.1	9,514	26.1	10,424	29.1
6	146,484	82.6	205,758	86.5	284,214	89.4	337,399	91.4	389,747	93.0	459,965	94.5
7	4,438	11.0	6,012	15.0	9,036	22.1	10,273	25.2	11,988	28.9	13,474	32.4
8	14,990	26.1	22,754	35.5	33,856	44.2	41,438	49.4	44,463	50.9	54,545	56.7
9	11,367	58.3	10,960	63.6	12,541	61.9	11,306	62.1	11,644	61.8	12,853	62.8
10	10,042	14.2	13,093	22.8	16,283	23.2	20,614	29.4	23,011	32.5	26,202	37.6
11	181,619	77.1	266,505	82.4	349,311	85.1	418,183	87.8	468,655	89.0	542,297	90.9
12	2,546	6.4	5,931	13.2	9,859	20.8	18,821	37.2	18,420	32.1	25,609	40.1
13	4,728	10.1	5,104	11.3	6,146	13.5	7,869	17.8	9,293	20.8	10,585	24.2
14	1,956	13.5	2,560	16.2	7,781	40.4	10,374	51.0	12,094	55.1	17,824	70.5
15	6,551	10.6	12,431	17.7	17,407	22.6	30,362	34.4	38,080	40.0	53,639	50.0
TOTAL	450,498	48.0	635,824	56.6	843,211	63.3	1,007,407	68.8	1,136,227	71.5	1,333,647	75.8

Census Division	1980+	% of Total Population of Census Division	1985+	% of Total Population of Census Division	1990+	% of Total Population of Census Division	1995+	% of Total Population of Census Division	1999+	% of Total Population of Census Division
1	30,956	76.5	31,980	77.5	32,657	78.5	32,950	79.5	33,044	80.3
2	65,865	69.4	73,312	72.6	81,046	75.9	88,587	79.1	94,827	81.6
3	13,734	46.2	14,129	47.9	14,287	49.6	14,223	51.4	14,033	52.7
4	4,127	30.0	4,428	32.5	4,672	35.0	4,832	37.5	4,917	39.5
5	11,368	32.1	12,253	35.1	12,925	38.1	13,335	41.1	13,534	43.5
6	538,766	95.6	624,972	96.5	714,007	97.2	804,040	97.7	878,072	98.0
7	15,069	35.9	16,686	39.4	18,144	42.9	19,353	46.4	20,210	49.2
8	66,446	62.5	80,059	68.3	94,835	74.1	110,660	79.9	124,443	84.6
9	14,176	63.8	15,586	64.8	16,976	65.8	18,405	64.5	19,625	67.6
10	29,387	42.8	32,240	47.9	34,556	53.1	36,006	58.2	36,776	62.4
11	624,570	92.4	713,640	93.7	803,931	94.7	893,307	95.5	965,877	96.0
12	36,585	49.8	46,224	56.5	57,106	63.2	68,858	69.9	78,947	75.2
13	12,853	27.6	12,998	31.0	13,897	34.5	14,420	37.9	14,659	40.6
14	23,382	80.0	27,607	83.5	31,823	86.0	36,197	88.5	39,866	90.5
15	71,746	60.0	88,128	66.0	104,905	71.0	122,641	76.0	137,744	80.0
TOTAL	1,558,030	79.6	1,794,224	82.7	2,035,767	85.4	2,277,814	87.8	2,476,574	89.6

[1] As of June 1 each year

* Actual   + Estimated, but estimates not available for 2005

Sources: Various series, **Census of Canada**; and Alberta Oil and Gas Conservation Board.

TABLE I-6

ALBERTA'S RURAL POPULATION, TOTAL AND BY CENSUS DIVISION, 1951-2005[1]

Census Division	1951*	% of Total Population of Census Division	1956*	% of Total Population of Census Division	1961*	% of Total Population of Census Division	1966*	% of Total Population of Census Division	1970+	% of Total Population of Census Division	1975+	% of Total Population of Census Division
1	10,415	36.8	10,668	30.9	11,313	28.9	9,983	25.7	9,940	25.5	9,702	24.5
2	37,778	55.8	34,795	46.4	36,120	43.6	32,091	38.8	31,593	37.0	30,237	33.8
3	18,936	68.4	19,127	62.8	18,180	58.7	17,491	59.1	17,351	57.3	16,629	55.6
4	11,155	84.6	11,967	83.7	12,375	82.4	11,591	81.5	10,658	75.0	10,085	72.5
5	31,854	81.6	31,054	81.5	32,383	85.0	29,456	81.9	26,940	73.9	25,397	70.9
6	30,957	17.4	32,128	13.5	33,775	10.6	31,741	8.6	29,291	7.0	26,925	5.5
7	35,779	89.0	34,202	85.0	31,801	77.9	30,560	74.8	29,492	71.1	28,112	67.6
8	42,523	73.9	41,414	64.5	42,677	55.8	42,474	50.6	42,891	49.1	41,656	43.3
9	8,129	41.7	6,279	36.4	7,733	38.1	6,889	37.9	7,197	38.2	7,164	37.2
10	60,635	85.8	58,407	77.2	53,894	76.8	49,597	70.6	47,791	67.5	43,483	62.4
11	53,856	22.9	57,034	17.6	61,368	14.9	57,870	12.2	57,805	11.0	54,289	9.1
12	37,340	93.6	39,016	86.8	37,451	79.2	31,814	62.8	38,964	67.9	38,270	59.9
13	41,910	89.9	39,929	88.7	38,685	86.5	36,273	82.2	35,385	79.2	33,153	75.8
14	12,487	86.5	13,286	83.8	11,501	59.6	9,984	49.0	9,855	44.9	7,749	29.5
15	55,249	89.4	57,986	82.3	59,477	77.4	57,982	65.6	57,119	60.0	53,639	50.0
TOTAL	489,003	52.0	487,292	43.4	488,733	36.7	455,796	31.2	452,272	28.5	426,940	24.2

Census Division	1980+	% of Total Population of Census Division	1985+	% of Total Population of Census Division	1990+	% of Total Population of Census Division	1995+	% of Total Population of Census Division	1999+	% of Total Population of Census Division
1	9,745	23.5	9,285	22.5	8,944	21.5	8,496	20.5	8,107	19.7
2	29,041	30.6	27,669	27.4	25,734	24.1	23,407	20.9	21,383	18.4
3	15,993	53.8	15,368	52.1	14,517	50.4	13,448	48.6	12,596	47.3
4	9,630	70.0	9,196	67.5	8,678	65.0	8,053	62.5	7,530	60.5
5	24,046	67.9	22,655	64.9	20,998	61.9	19,110	58.9	17,578	56.5
6	24,738	4.4	22,735	3.5	20,871	2.8	19,181	2.3	17,920	2.0
7	26,907	64.1	25,664	60.6	24,150	57.1	22,356	53.6	20,867	50.8
8	39,868	37.5	37,158	31.7	33,148	25.9	27,838	20.1	22,653	15.4
9	8,044	36.2	8,457	35.2	8,823	34.2	9,147	35.5	9,406	32.4
10	39,275	57.2	35,067	52.1	30,521	46.9	25,860	41.8	22,154	37.6
11	51,006	7.6	47,901	6.3	44,903	5.3	42,289	4.5	40,245	4.0
12	36,879	50.2	35,589	43.5	33,252	36.8	29,651	30.1	26,036	24.8
13	31,094	72.4	28,932	69.0	26,385	65.5	23,628	62.1	21,446	59.4
14	5,845	20.0	5,455	16.5	5,181	14.0	4,704	11.5	4,185	9.5
15	47,830	40.0	45,400	34.0	42,840	29.0	38,729	24.0	34,436	20.0
TOTAL	399,941	20.4	376,531	17.3	349,044	14.6	315,897	12.2	286,542	10.4

[1] As of June 1 each year

* Actual + Estimated, but estimates not available for 2005

Sources: Various series, **Census of Canada**; and Alberta Oil and Gas Conservation Board.

TABLE I-7

POPULATION OF CALGARY AND EDMONTON CENSUS DIVISIONS, TOTAL AND BY AGE GROUPS, 1956-2005[1]

Age Groups	1956*	% of Prov. Total	1961*	% of Prov. Total	1966*	% of Prov. Total	Age Groups[2]	1970+	% of Prov. Total	1975+	% of Prov. Total
0 - 4	75,730		101,461		101,015		0 - 4	94,028	61.5	108,242	62.9
5 - 9	59,657		84,918		102,123		5 - 11	149,859	58.8	139,057	61.1
10 - 14	41,658	48.3	65,738	53.7	86,142	57.3					
15 - 19	35,758		48,601		70,900		12 - 17	114,630	56.6	135,331	58.7
20 - 24	45,698		52,314		64,069		18 - 24	114,282	59.2	145,733	60.8
25 & over	302,924	51.5	375,626	55.7	419,944	58.2	25 & over	472,699	60.2	555,113	62.3
Total Male	287,601	49.1	370,550	53.8	424,044	56.8		471,788	58.6	538,198	60.8
Total Female	273,824	51.0	358,118	55.7	421,149	58.7		473,710	60.4	545,278	62.3
TOTAL	561,425	49.9	728,668	54.7	845,193	57.8		945,498	59.5	1,083,476	61.5

Age Groups[2]	1980+	% of Prov. Total	1985+	% of Prov. Total	1990+	% of Prov. Total	1995+	% of Prov. Total	1999+	% of Prov. Total	2005+	% of Prov. Total
0 - 4	130,757	64.0	150,874	65.5	161,952	67.3	170,046	69.3	180,119	70.4	201,955	71.4
5 - 11	151,699	63.3	181,119	64.2	210,359	65.6	228,542	67.3	237,556	68.9	256,743	70.6
12 - 17	127,768	61.7	131,017	64.8	153,974	65.3	180,562	66.4	196,545	67.5	209,387	69.7
18 - 24	173,621	63.7	174,536	65.5	168,909	68.7	191,561	69.1	216,414	69.3	247,818	70.5
25 & over	655,235	63.4	771,702	64.9	888,608	66.2	988,106	67.7	1,071,480	68.7	1,212,457	70.0
Total Male	613,605	62.6	696,431	64.3	781,492	65.9	866,851	67.3	936,916	68.4	1,047,870	69.8
Total Female	625,475	64.0	712,817	65.5	802,310	66.9	891,966	68.3	965,198	69.3	1,080,490	70.6
TOTAL	1,239,080	63.3	1,409,248	64.9	1,583,802	66.4	1,758,817	67.8	1,902,114	68.8	2,128,360	70.2

[1] As of June 1 each year. The Calgary and Edmonton Census Divisions are numbers 6 and 11 respectively.

[2] Note that different age groups are used for estimates than are used for actual census data.

* Actual +Estimated

Sources: Various series, **Census of Canada**; and Alberta Oil and Gas Conservation Board.

TABLE I-8

PROVINCIAL POPULATION OUTSIDE CALGARY AND EDMONTON CENSUS DIVISIONS, TOTAL BY AGE GROUPS, 1956-2005[1]

Age Groups	1956*	% of Prov. Total	1961*	% of Prov. Total	1966*	% of Prov. Total	Age Groups[2]	1970+	% of Prov. Total	1975+	% of Prov. Total
0 - 4	73,967		78,427		72,553		0 - 4	58,838	38.5	63,804	37.1
5 - 9	66,163		74,135		76,417						
10 - 14	55,660	51.7	64,645	46.3	71,516	42.7	5 - 11	104,961	41.2	88,620	38.9
15 - 19	43,401		50,403		58,099		12 - 17	88,042	43.4	95,074	41.3
20 - 24	37,144		36,840		37,936	41.8	18 - 24	78,849	40.8	94,045	39.2
25 & over	285,386	48.5	298,826	44.3	301,489		25 & over	312,310	39.8	335,570	37.7
Total Male	298,320	50.9	318,833	46.2	322,201	43.2		332,680	41.4	347,534	39.2
Total Female	263,371	49.0	384,443	44.3	295,809	41.3		310,320	39.6	329,579	37.7
TOTAL	561,691	50.1	603,276	45.3	618,010	**42.2**		643,000	40.5	677,113	38.5

Age Groups[2]	1980+	% of Prov. Total	1985+	% of Prov. Total	1990+	% of Prov. Total	1995+	% of Prov. Total	1999+	% of Prov. Total	2005+	% of Prov. Total
0 - 4	73,604	36.0	79,401	34.5	78,537	32.7	75,394	30.7	75,883	29.6	81,015	28.6
5 - 11	88,070	36.7	100,899	35.8	110,168	34.4	111,015	32.7	107,425	31.1	106,881	29.4
12 - 17	79,184	38.3	71,131	35.2	81,941	34.7	91,411	33.6	94,651	32.5	91,095	30.3
18 - 24	99,035	36.3	91,954	34.5	76,981	31.3	85,462	30.9	95,910	30.7	103,865	29.5
25 & over	378,763	36.6	418,122	35.1	453,381	33.8	471,612	32.3	487,123	31.3	519,955	30.0
Total Male	366,457	37.4	386,297	35.7	404,717	34.1	420,584	32.7	432,982	31.6	453,246	30.2
Total Female	352,199	36.0	375,210	34.5	396,291	33.1	414,310	31.7	428,010	30.7	449,565	29.4
TOTAL	718,656	36.7	761,507	35.1	801,008	33.6	834,894	32.2	860,992	31.2	902,811	29.8

[1] As of June 1 each year

[2] Note that different age groups are used for estimates than are used for actual census data.

* Actual +Estimated

Sources: Various series, **Census of Canada**; and Alberta Oil and Gas Conservation Board.

TABLE I-9

POPULATION OF SOUTHERN REGION, TOTAL AND BY AGE GROUPS, 1956-2005[1]

Age Groups	1956*	% of Prov. Total	1961*	% of Prov. Total	1966*	% of Prov. Total	Age Groups[2]	1970+	% of Prov. Total	1975+	% of Prov. Total
0 - 4	18,541		19,643		16,464		0 - 4	13,583	8.9	14,753	8.6
5 - 9	15,959		18,627		17,950		5 - 11	23,644	9.3	19,170	8.4
10 - 14	13,036	12.5	15,883	11.7	17,193	10.2					
15 - 19	9,513		12,725		14,462		12 - 17	21,301	10.5	25,575	11.1
20 - 24	9,842		9,723		9,349		18 - 24	20,180	10.4	25,038	10.4
25 & over	73,022	12.4	76,812	11.4	75,751	10.5	25 & over	75,941	9.7	74,435	8.4
Total Male	72,285	12.3	78,945	11.5	76,906	10.3		78,266	9.8	80,012	9.0
Total Female	67,628	12.6	74,468	11.6	74,263	10.4		76,383	9.7	78,959	9.1
TOTAL	139,913	12.4	153,413	11.5	151,169	10.3		154,649	9.7	158,971	9.0

Age Groups[2]	1980+	% of Prov. Total	1985+	% of Prov. Total	1990+	% of Prov. Total	1995+	% of Prov. Total	1999+	% of Prov. Total	2005+	% of Prov. Total
0 - 4	17,040	8.4	18,028	7.8	17,322	7.2	16,256	6.6	16,204	6.3	17,206	6.1
5 - 11	19,209	8.0	22,320	7.9	24,123	7.5	23,617	7.5	22,352	6.5	21,830	6.0
12 - 17	17,078	8.3	15,463	7.6	18,065	7.8	20,144	7.4	20,425	7.0	18,975	6.3
18 - 24	25,276	9.3	22,155	8.3	18,651	7.6	20,789	7.4	23,596	7.6	24,516	7.0
25 & over	86,496	8.3	93,777	7.9	99,023	7.4	100,305	6.9	101,413	6.5	106,531	6.1
Total Male	82,770	8.4	85,885	7.8	88,484	7.5	90,411	7.0	91,907	6.7	94,641	6.3
Total Female	82,329	8.4	85,858	7.9	88,700	7.4	90,700	7.0	92,083	6.6	94,417	6.2
TOTAL	165,099	8.4	171,743	7.9	177,184	7.4	181,111	7.0	183,990	6.7	189,058	6.2

[1] As of June 1 each year. Southern Region includes census divisions 1, 2 and 3.

[2] Note that different age groups are used for estimates than are used for actual census data.

* Actual +Estimated

Sources: Various series, **Census of Canada**; and Alberta Oil and Gas Conservation Board.

TABLE I-10

POPULATION OF CENTRAL REGION, TOTAL AND BY AGE GROUPS, 1956-2005[1]

Age Groups	1956*	% of Prov. Total	1961*	% of Prov. Total	1966*	% of Prov. Total	Age Groups[2]	1970+	% of Prov. Total	1975+	% of Prov. Total
0 - 4	28,606		29,325		26,754		0 - 4	22,299	14.6	24,117	14.0
5 - 9	26,269		28,521		28,913		5 - 11	38,402	15.1	32,361	14.8
10 - 14	22,594	20.3	25,725	17.8	28,045	16.4					
15 - 19	17,656		20,201		23,236		12 - 17	33,497	16.5	32,422	14.1
20 - 24	13,682		13,581		14,525		18 - 24	30,703	15.9	34,140	14.2
25 & over	119,489	20.3	123,329	18.3	123,694	17.1	25 & over	125,399	16.0	134,167	15.1
Total Male	120,973	20.6	126,970	18.4	127,526	17.1	Total Male	129,209	16.1	131,713	14.9
Total Female	107,323	20.0	113,712	17.7	117,641	16.4	Total Female	121,091	15.4	125,494	14.3
TOTAL	228,296	20.3	240,682	18.1	245,167	16.8		250,300	15.8	257,207	14.6

Age Groups[2]	1980+	% of Prov. Total	1985+	% of Prov. Total	1990+	% of Prov. Total	1995+	% of Prov. Total	1999+	% of Prov. Total	2005+	% of Prov. Total
0 - 4	26,839	13.1	27,793	12.1	26,476	11.0	24,793	10.1	24,631	9.6	25,711	9.1
5 - 11	32,543	13.5	36,428	12.9	38,301	11.9	37,126	10.8	35,081	10.7	34,130	9.4
12 - 17	27,635	13.3	25,470	12.6	28,967	12.3	31,264	11.5	31,316	10.8	28,875	9.6
18 - 24	33,727	12.4	29,644	11.1	24,848	10.1	27,876	10.1	30,702	9.8	31,872	9.1
25 & over	145,379	14.1	156,071	13.1	164,035	12.2	166,344	11.4	168,922	10.8	175,447	10.1
Total Male	135,391	13.8	139,376	12.8	142,440	12.0	144,394	11.2	145,791	10.6	148,340	9.9
Total Female	130,732	13.4	136,030	12.5	140,187	11.7	143,009	10.9	144,861	10.4	147,695	9.7
TOTAL	266,123	13.6	275,406	12.7	282,627	11.9	287,403	11.1	290,652	10.5	296,035	9.8

[1] As of June 1 each year. Central Region includes Census Divisions 4, 5, 7, 8 and 10.

[2] Note that different age groups are used for estimates than are used for actual census data.

* Actual +Estimated

Sources: Various series, **Census of Canada**; and Alberta Oil and Gas Conservation Board.

TABLE I-11

POPULATION OF NORTHERN REGION, TOTAL AND BY AGE GROUPS, 1956-2005[1]

Age Groups	1956*	% of Prov. Total	1961*	% of Prov. Total	1966*	% of Prov. Total
0 - 4	22,635		24,097		24,699	
5 - 9	20,367		22,457		24,752	
10 - 14	17,290	16.0	19,422	13.9	22,142	13.5
15 - 19	13,993		14,734		17,140	
20 - 24	11,260		10,470		11,393	
25 & over	74,852	12.7	78,445	11.6	82,995	11.5
Total Male	86,705	14.8	91,155	13.2	97,209	13.0
Total Female	73,692	13.7	78,470	12.2	85,912	12.0
TOTAL	160,397	14.3	169,625	12.7	183,121	12.5

Age Groups[2]	1970+	% of Prov. Total	1975+	% of Prov. Total
0 - 4	19,115	12.5	20,588	12.0
5 - 11	36,163	14.2	30,861	13.6
12 - 17	28,009	13.8	31,010	13.5
18 - 24	23,384	12.1	29,097	12.1
25 & over	90,590	11.5	103,339	11.6
Total Male	103,662	12.9	111,786	12.6
Total Female	93,599	11.9	103,109	11.8
	197,261	12.4	214,895	12.2

Age Groups[2]	1980+	% of Prov. Total	1985+	% of Prov. Total	1990+	% of Prov. Total	1995+	% of Prov. Total	1999+	% of Prov. Total	2005+	% of Prov. Total
0 - 4	24,598	12.0	27,784	12.1	28,595	11.9	27,988	11.4	28,388	11.1	30,744	10.9
5 - 11	29,863	12.5	34,702	12.3	39,326	12.3	41,268	12.2	40,744	11.8	41,107	11.3
12 - 17	28,667	13.9	24,606	12.2	28,527	12.2	32,741	12.0	35,114	12.0	35,070	11.7
18 - 24	33,201	12.2	33,167	12.5	27,047	11.0	29,665	10.7	33,653	10.8	38,472	10.9
25 & over	119,658	11.6	137,012	11.5	154,899	11.5	166,265	11.4	175,369	11.3	191,958	11.1
Total Male	121,701	12.4	131,753	12.2	141,771	12.0	151,033	11.7	158,300	11.6	169,750	11.3
Total Female	114,286	11.7	125,518	11.5	136,623	11.4	146,894	11.2	154,968	11.1	167,601	11.0
TOTAL	235,987	12.1	257,271	11.9	278,394	11.7	297,927	11.5	313,268	11.3	337,351	11.1

[1] As of June 1 each year. Northern Region includes Census Divisions 12, 13 and 15.

[2] Note that different age groups are used for estimates than are used for actual census data.

* Actual +Estimated

Sources: Various series, **Census of Canada**; and Alberta Oil and Gas Conservation Board.

TABLE I-12

POPULATION OF MOUNTAIN REGION, TOTAL AND BY AGE GROUPS, 1956-2005[1]

Age Groups	1956*	% of Prov. Total	1961*	% of Prov. Total	1966*	% of Prov. Total
0 - 4	4,185		5,362		4,636	
5 - 9	3,568		4,530		4,802	
10 - 14	2,740	2.8	3,615	2.9	4,136	2.6
15 - 19	2,239		2,743		3,261	
20 - 24	2,360		3,066		2,669	
25 & over	17,993	3.1	20,240	3.0	19,049	2.6
Total Male	18,357	3.1	21,763	3.2	20,560	2.8
Total Female	14,728	2.7	17,793	2.8	17,993	2.5
TOTAL	33,085	3.0	39,556	3.0	38,553	2.6

Age Groups[2]	1970+	% of Prov. Total	1975+	% of Prov. Total
0 - 4	3,841	2.5	4,346	2.5
5 - 11	6,752	2.6	6,228	2.7
12 - 17	5,235	2.6	6,067	2.6
18 - 24	4,582	2.4	5,770	2.4
25 & over	20,380	2.6	23,629	2.7
	21,543	2.7	24,023	2.7
	19,247	2.5	22,017	2.5
	40,790	2.6	46,040	2.6

Age Groups[2]	1980+	% of Prov. Total	1985+	% of Prov. Total	1990+	% of Prov. Total	1995+	% of Prov. Total	1999+	% of Prov. Total	2005+	% of Prov. Total
0 - 4	5,127	2.5	5,796	2.5	6,144	2.6	6,357	2.6	6,660	2.6	7,354	2.6
5 - 11	6,455	2.7	7,449	2.6	8,418	2.7	9,004	2.7	9,248	2.7	9,814	2.7
12 - 17	5,804	2.7	5,592	2.8	6,382	2.7	7,262	2.7	7,796	2.7	8,175	2.7
18 - 24	6,831	2.5	6,988	2.6	6,435	2.6	7,132	2.6	7,959	2.5	9,005	2.6
25 & over	27,230	2.6	31,262	2.6	35,424	2.6	38,698	2.7	41,419	2.7	46,019	2.7
Total Male	26,595	2.7	29,283	2.7	32,022	2.6	34,746	2.7	36,984	2.7	40,515	2.7
Total Female	24,852	2.5	27,804	2.6	30,781	2.6	33,707	2.6	36,098	2.6	39,852	2.6
TOTAL	51,447	2.6	57,087	2.6	62,803	2.6	68,453	2.6	73,082	2.6	80,367	2.7

[1] As of June 1 each year. Mountain Region includes Census Divisions 9 and 14.

[2] Note that different age groups are used for estimates than are used for actual census data.

* Actual +Estimated

Sources: Various series, **Census of Canada**; and Alberta Oil and Gas Conservation Board.

TABLE I-13

POPULATION OF EDMONTON REGION, TOTAL AND BY AGE GROUPS, 1956-2005[1]

Age Groups	1956*	% of Prov. Total	1961*	% of Prov. Total	1966*	% of Prov. Total	Age Groups[2]	1970+	% of Prov. Total	1975+	% of Prov. Total
0 - 4	45,045		57,903		57,511		0 - 4	52,935	34.6	59,668	34.7
5 - 9	35,031		48,912		58,446		5 - 11	83,962	32.9	77,057	33.8
10 - 14	24,912	28.8	37,764	30.9	49,388	32.8					
15 - 19	21,731		28,448		40,961		12 - 17	64,998	32.1	75,349	32.7
20 - 24	27,006		30,018		36,980		18 - 24	64,449	33.4	81,463	34.1
25 & over	169,814	28.9	207,634	30.8	232,767	32.3	25 & over	260,116	33.1	303,049	33.9
Total Male	165,262	28.3	209,518	30.3	239,697	33.0		262,522	33.6	298,458	34.1
Total Female	158,277	29.5	201,161	31.3	236,356	32.1		263,938	32.7	298,128	33.7
TOTAL	323,539	28.8	410,679	30.8	476,053	32.5		526,460	33.1	596,586	33.9

Age Groups[2]	1980+	% of Prov. Total	1985+	% of Prov. Total	1990+	% of Prov. Total	1995+	% of Prov. Total	1999+	% of Prov. Total	2005+	% of Prov. Total
0 - 4	71,265	34.9	81,358	35.3	86,436	35.9	89,805	36.6	94,473	36.9	105,162	37.2
5 - 11	82,474	34.4	97,548	34.7	112,328	35.0	120,918	35.6	124,691	36.1	133,420	36.7
12 - 17	70,511	34.1	70,944	35.1	82,597	35.0	96,167	35.4	104,006	35.7	109,578	36.5
18 - 24	95,800	35.1	95,395	35.8	91,019	37.0	102,119	36.9	114,894	36.8	130,562	37.1
25 & over	355,526	34.4	416,296	35.0	476,544	35.6	526,587	36.1	568,058	36.4	638,442	36.9
Total Male	336,810	34.5	379,021	35.0	421,943	35.6	464,552	36.2	499,289	36.4	554,132	36.9
Total Female	338,766	34.7	382,520	35.2	426,981	35.6	471,044	36.1	506,833	36.4	563,032	36.8
TOTAL	675,576	34.5	761,541	35.1	848,924	35.6	935,596	36.1	1,006,122	36.4	1,117,164	36.8

[1] As of June 1 each year. Edmonton Region is Census Division 11.

[2] Note that different age groups are used for estimates than are used for actual census data.

* Actual +Estimated

Sources: Various series, **Census of Canada**; and Alberta Oil and Gas Conservation Board.

TABLE I-14

POPULATION OF CALGARY REGION, TOTAL AND BY AGE GROUPS, 1956-2005[1]

Age Groups	1956*	% of Prov. Total	1961*	% of Prov. Total	1966*	% of Prov. Total	Age Groups[2]	1970+	% of Prov. Total	1975+	% of Prov. Total
0 - 4	30,685		43,558		43,504		0 - 4	41,093	26.9	48,574	28.2
5 - 9	24,626		36,006		44,677		5 - 11	65,897	25.9	62,000	27.2
10 - 14	16,746	19.6	27,974	22.8	36,754	24.5					
15 - 19	14,027		20,153		29,939		12 - 17	49,632	24.5	59,982	26.0
20 - 24	18,692		22,296		27,089		18 - 24	49,833	25.8	64,270	26.8
25 & over	133,110	22.6	168,002	24.9	187,177	25.9	25 & over	212,583	27.1	252,064	28.3
Total Male	122,339	20.9	161,032	23.4	184,347	24.7		207,850	25.9	240,070	27.1
Total Female	115,547	21.5	156,957	24.4	184,793	25.7		211,188	26.9	246,820	28.2
TOTAL	237,886	21.2	317,989	23.9	369,140	25.3		419,038	26.4	486,890	27.7

Age Groups[2]	1980+	% of Prov. Total	1985+	% of Prov. Total	1990+	% of Prov. Total	1995+	% of Prov. Total	1999+	% of Prov. Total	2005+	% of Prov Total
0 - 4	59,492	29.1	69,516	30.2	75,516	31.4	80,241	32.7	85,646	33.5	96,793	34.2
5 - 11	69,225	28.9	83,571	29.6	98,031	30.6	107,624	31.7	112,865	32.7	123,323	33.9
12 - 17	57,257	27.7	60,073	29.7	71,377	30.0	84,395	31.0	92,539	31.8	99,809	33.2
18 - 24	77,821	28.5	79,141	29.7	77,890	31.7	89,442	32.3	101,520	32.5	117,256	33.3
25 & over	299,709	29.0	355,406	29.9	412,064	30.7	461,519	31.5	503,422	32.3	574,015	33.1
Total Male	276,795	28.2	317,410	29.3	359,549	30.3	402,299	31.2	437,627	31.9	493,738	32.9
Total Female	286,709	29.3	330,297	30.3	375,329	31.3	420,922	32.2	458,365	32.9	517,458	33.7
TOTAL	563,504	28.8	647,707	29.8	734,878	30.8	823,221	31.7	895,992	32.5	1,011,196	33.4

[1] As of June 1 each year. Calgary Region is Census Division 6.

[2] Note that different age groups are used for estimates than are used for actual census data.

* Actual +Estimated

Sources: Various series, **Census of Canada**; and Alberta Oil and Gas Conservation Board.

TABLE I-15

RELIGIOUS PREFERENCES, ALBERTA, 1961

Denomination	Population	Per cent of Total
Anglican Church of Canada	156,630	11.8
Baptist	42,430	3.2
Greek Orthodox	47,353	3.6
Lutheran	122,520	9.2
Mormon	25,537	1.9
Presbyterian	55,337	4.2
Roman Catholic	298,741	22.4
Ukrainian (Greek) Catholic	35,260	2.7
United Church of Canada	418,927	31.4
Others	129,209	9.6
TOTAL	1,331,944	100.0

Source: **Census of Canada**, 1961.

TABLE I-16

FRENCH, INDIAN, AND ESKIMO POPULATION OF ALBERTA BY REGION, 1961

	French	Per cent of Total	Indian and Eskimo	Per cent of Total
Southern Region[1]	4,001	4.8	4,503	15.8
Central Region[2]	8,489	10.2	3,217	11.3
Northern Region[3]	27,019	32.4	14,561	51.0
Mountain Region[4]	2,501	3.0	1,596	5.6
Edmonton Region[5]	28,836	34.6	3,701	13.0
Calgary Region[6]	12,473	15.0	976	3.4
Provincial Total	83,319	100.0	28,554	100.0

[1] Southern Region includes Census Divisions 1, 2 and 3

[2] Central Region includes Census Divisions 4, 5, 7, 8 and 10

[3] Northern Region includes Census Divisions 12, 13 and 15

[4] Mountain Region includes Census Divisions 9 and 14

[5] Edmonton Region includes Census Division 11

[6] Calgary Region includes Census Division 6

Source: Alberta Bureau of Statistics and **Census of Canada**, 1961

CHAPTER TWO

ENROLMENT LEVELS – PAST, PRESENT, AND FUTURE

Primary and Secondary School Enrolment

Enrolment Characteristics 1950 to 1970

Total enrolment in primary and secondary schools in Alberta showed dramatic growth between 1950 and 1970. The number of students enrolled in Grades 1-12 increased from 173,969 in 1950-51 to 223,949 in 1955-56; to 294,435 in 1960-61; to 362,159 in 1965-66; and to 409,433 in 1969-70 (see Table II-1 and Figure II-1). In other words, total enrolment in primary and secondary schools increased by nearly two and a half times between 1950-51 and 1969-70.

The number of students in Grades 1-6 doubled during the period 1950-51 to 1969-70 — from 111,037 to 223,827—but the proportion of students in these grades decreased. While 63.8 per cent of total enrolment in 1950-51 and 63.9 per cent in 1955-56 were in Grades 1-6, the percentages for the school years 1960-61, 1965-66, and 1969-70 were 60.4, 57.7, and 54.7, respectively. The change is attributed in part to the large increase in participation rates of 14-17 year-olds (Grades 9-12), from 59.8 per cent in 1951-52 to 96.5 per cent in 1969-70.

The proportion of students in Grades 7-9 increased only slightly from 23.4 per cent in 1950-51 to 24.7 per cent in 1969-70. In absolute numbers, enrolment in these grades increased by about two and a half times between 1950-51 and 1969-70 — from 40,744 to 101,000.

Enrolment of students in Grades 10-12 showed a substantial absolute and relative increase. From 12.8 per cent of the total primary and secondary school enrolment in 1950-51, it decreased to 12.5 per cent in 1955-56, and then rose to 14.7 per cent in 1960-61, 17.9 per cent in 1965-66, and 20.6 per cent in 1969-70. The number of students enrolled in Grades 10-12 grew from 22,188 in 1950-51 to 84,606 in 1969-70, an increase of nearly 300 per cent during the period.

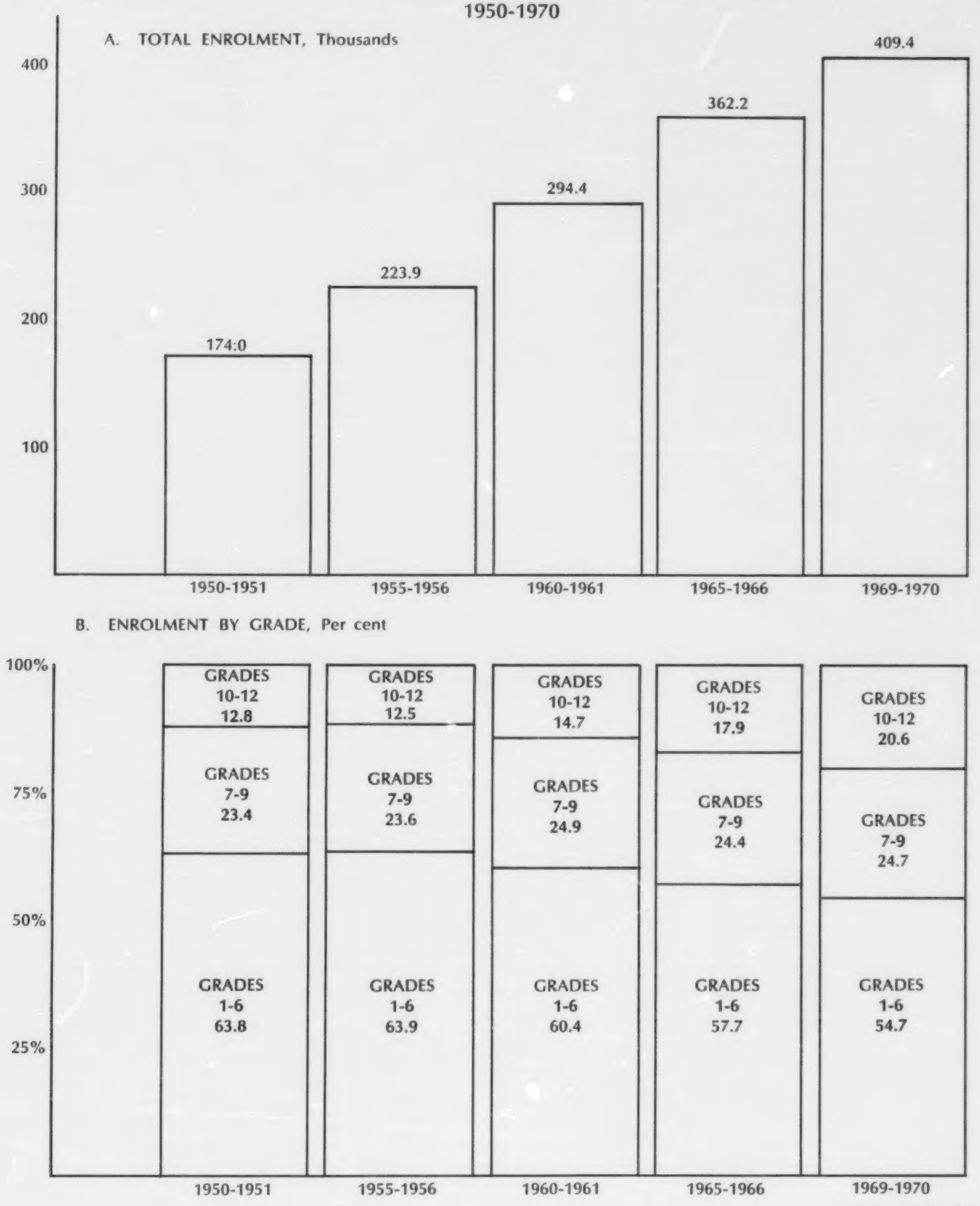
Table II-2 shows that between 1956-57 and 1969-70 total primary and secondary enrolment increased in all six regions in the Province of Alberta. In the Southern Region, enrolment in Grades 1-12 rose from 30,471 students in 1956-57 to 40,305 in 1969-70. These changes represent an increase of 20.2 per cent between 1956-57 and 1961-62, 5.9 per cent between 1961-62 and 1966-67, and 3.9 per cent between 1966-67 and 1969-70. The Region's share of provincial primary and secondary school enrolment decreased from 13 per cent in 1956-57 to 9.8 per cent in 1969-70.

Most of the increase in enrolment in the Southern Region was associated with Grades 7-12, while enrolment in Grades 1-6 showed some tendency to rise between the school years 1956-57 and 1966-67, after which it decreased. Enrolment figures in Grades 7-12 in the four school years covered by Table II-2 were 11,087, 14,642, 16,623, and 19,489 students. Corresponding figures for enrolment in Grades 1-6 were 19,384, 21,974, 22,158, and 20,816 students.

In the Central Region, Table II-2 indicates that enrolment in Grades 1-12 between 1956-57 and 1969-70 grew from 51,332 to 64,423 students. The rates of increase of enrolment within these 5-year intervals were 12.7, 8.9, and 2.2 per cent. The region's share of Grade 1-12 enrolment decreased from 21.9 to 15.7 per cent of the total provincial enrolment. As in the case of the Southern Region, enrolment increased primarily in Grades 7-12. Enrolment in Grades 1-6 increased between 1956-57 and 1966-67, and then decreased. Enrolment figures for Grades 7-12 were 18,677 in 1956-57 and 30,625 in 1969-70. Corresponding figures for Grades 1-6 were 32,655 and 33,798.

In the Mountain Region, enrolment in Grades 1-12 increased from 6,564 to 10,646 between 1956-57 and 1969-70. The rates of increase by 5-year intervals were 31.2, 16.9, and 5.7. During these years the region's share of provincial primary and secondary school enrolment varied between 2.8 and 2.6 per cent. Enrolment in Grades 7-12 grew from 2,388 in 1956-57 to 4,826 in 1969-70. Corresponding enrolment figures for Grades 1-6 were 4,176 and 5,820 (see Table II-2).

FIGURE II-1 PRIMARY AND SECONDARY ENROLMENT IN ALBERTA 1950-1970



Source: Table II-1

The Northern Region experienced a decline in its share of the total primary and secondary school enrolment from 16.9 per cent in 1956-57 to 14 per cent of the provincial total in the 1969-70 school year (see Table II-2). In absolute terms, enrolment in Grades 1-12 showed an increase from 39,613 students in 1956-57 to 57,397 in 1969-70. These changes represent 5-year interval increases of 12.6 per cent, 16.2 per cent, and 10.7 per cent. Enrolment increased substantially both in Grades 7-12 and 1-6, although Grades 7-12 enrolment grew at a faster rate. Thus, enrolment in Grades 7-12 increased from 14,413 in 1956-57 to 25,614 in 1969-70, while the corresponding figures for enrolment in Grades 1-6 were 25,200 and 31,783.

Primary and secondary enrolment in the Calgary Region grew from 43,362 in 1956-57 to 103,444 in 1969-70 (see Table II-2). The rates of increase by 5-year intervals were the highest in the province: 56.8 per cent, 32.2 per cent, and 15.1 per cent over the 15-year period. As a result of this rapid increase, the Region's share of the provincial enrolment rose from 18.5 per cent to 25.3 per cent between 1956-57 and 1969-70. The number of students increased very rapidly in Grades 7-12 and less rapidly in Grades 1-6. Enrolment in Grades 7-12 almost tripled between 1956-57 and 1969-70, while the Grades 1-6 enrolment more than doubled.

The Edmonton Region, as shown in Table II-2, had the largest share of provincial primary and secondary school enrolment during the period under consideration, ranging from 26.9 per cent in 1956-57 to 32.5 per cent in 1969-70. The number of students in Grades 1-12 increased from 63,055 in 1956-57 to 133,218 in 1969-70. The rates of increase by 5-year intervals were 45.9 per cent, 29.7 per cent, and 11.6 per cent. The enrolment in Grades 7-12 increased by almost two and a half times between 1956-57 and 1969-70, while in Grades 1-6 nearly doubled. In the first case, the number of students was 22,944 and 59,579 for the respective school years. Enrolment in Grades 1-6 was 40,111 in 1956-57 and 73,639 in 1969-70.

Total primary and secondary school enrolment in the province as a whole was 234,397 students in 1956-57; 307,702 in 1961-62; 372,894 in 1966-67, and 409,433 students in 1969-70. Corresponding rates of increase were 31.3, 21.2, and 9.8 per cent. These rates of growth were lower than those for the Calgary and Edmonton Regions. Provincial enrolment in Grades 7-12 more than doubled, while in Grades 1-6 it increased by one and a half times. The number of students in Grades 7-12 increased from 85,286 in 1956-57 to 185,606 in 1969-70. Corresponding levels for Grades 1-6 were 149,111 and 223,827.

Projected Enrolment, 1970 to 2005

Table II-3 and Figure II-2 show the estimated primary and secondary school enrolments in the Province of Alberta by 5-year intervals between 1970-71 and 2005-06. The enrolment projections are based on population projections for the relevant age groups and on estimated participation rates. Participation rates are higher than 100 per cent for Grades 1-6, because students younger than 6 and older than 11 will represent a small part of the Grades 1-6 enrolment.

From 1969-70 to 1975-76, the total provincial enrolment in Grades 1-6 is expected to fall from about 221,000 to about 196,000. Enrolment at the Grades 7-12 level will increase by about 30,000, increasing the total Grades 1-12 enrolment by only 5,000 during the period. Between 1975-76 and 1980-81, the enrolment in Grades 7-12 will fall by nearly 24,000. Enrolment in Grades 1-6 will increase slightly, but total enrolment of about 415,000 in 1980-81 will be nearly 17,000 less than in 1975-76. Enrolment in 1980-81, then, should be somewhat smaller than it was ten years earlier.

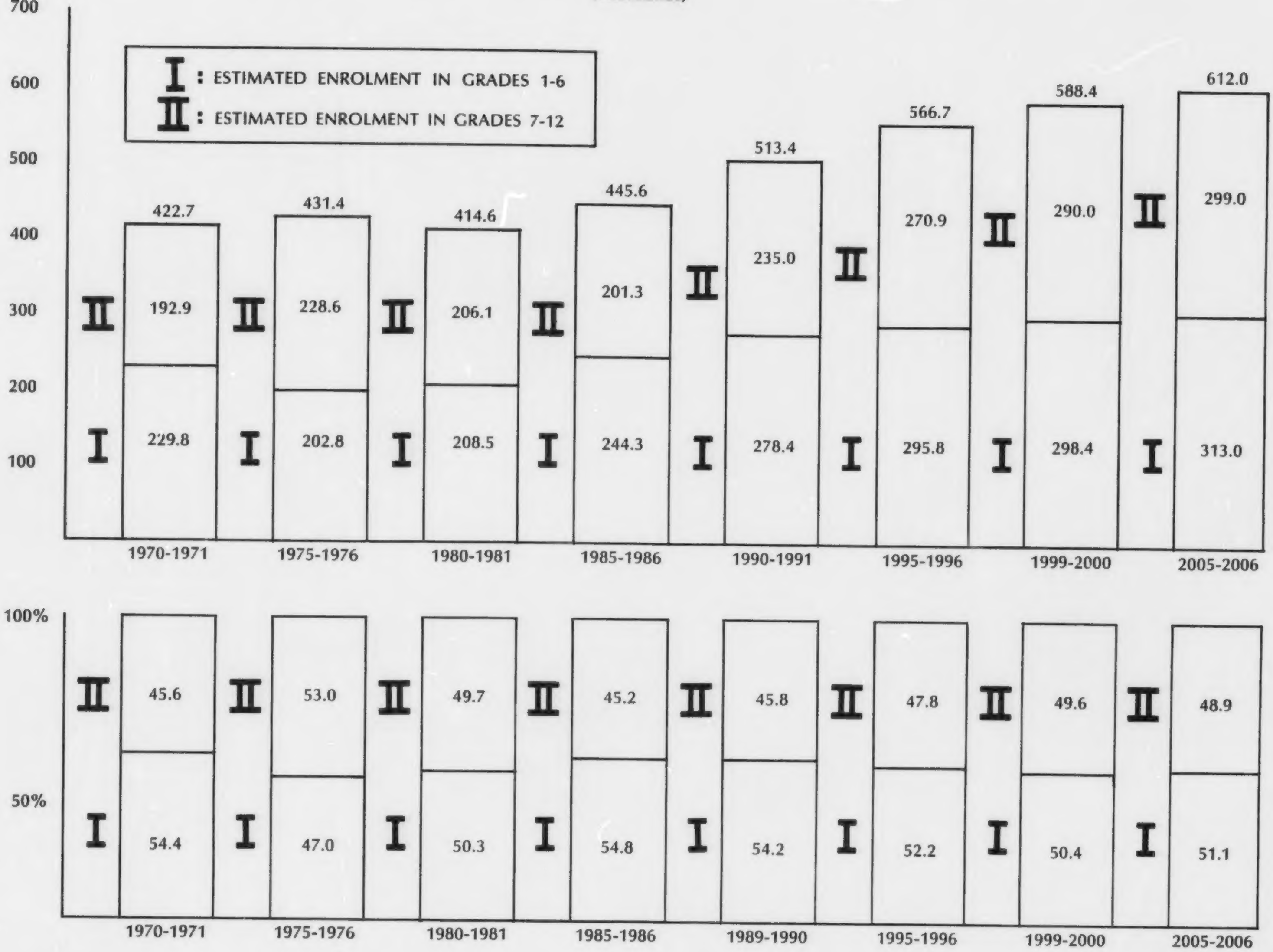
The projections suggest that enrolment in Grades 1-12 can be expected to increase from about 415,000 students in 1980-81 to about 612,000 students in 2005-06. Over the 25-year period, the percentage of students enrolled in Grades 1-6 is expected to vary from 54.4 in 1970-71 to 51.1 in 2005-06, while the percentage of enrolment in Grades 7-12 should vary from 45.6 to 48.9. Only in 1975-76 of the 5-year intervals will Grades 7-12 enrolment be greater than 1-6 enrolment.

Tables II-4 through II-9 show the estimated primary and secondary school enrolments in the six regions of Alberta during the 1970-2005 period. Participation rates are assumed to be the same for all regions as for the province.

Primary and secondary school enrolment in the Southern Region is anticipated to decrease from 41,950 students in 1970-71 to 33,198 in 1980-81,

FIGURE II-2 ESTIMATED PRIMARY AND SECONDARY ENROLMENT, 1970-2005

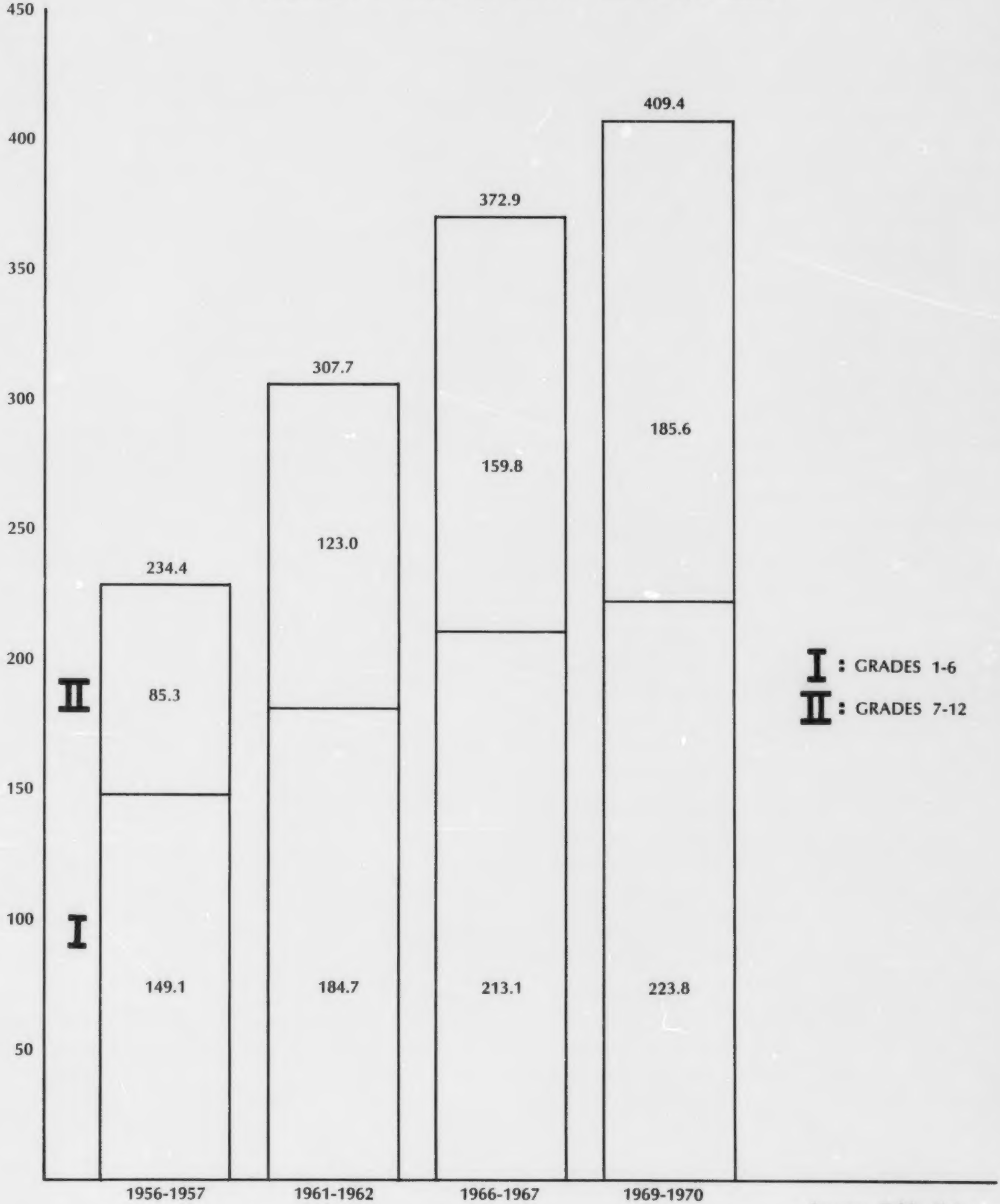
(Thousands)



Source: Table II-3

FIGURE II-2 (continued)

C. ENROLMENT IN GRADES 1-6 and 7-12, 1956 - 1970, Thousands



Source: Table II-1

and then increase to 37,658 students in 2005-06 (see Table II-4), although falling after 1995. Enrolment in Grades 1-6 is expected to decline from 21,373 in 1970-71 to 16,587 in 1980-81, and then to increase to 18,759 in 2005-06, declining after 1990. Enrolment in Grades 7-12 is expected to fall from 20,577 in 1970-71 to 17,000 in 1980-81, and then to increase to 18,899 in 2005-06, having reached a maximum in 1995. The Region's share of total provincial enrolment is expected to decrease, from 9.9 per cent in 1970-71 to 8.1 per cent in 1980-81 to 6.2 per cent in 2005-06.

Total primary and secondary school enrolment in the Central Region is also expected to decrease, from 66,982 students in 1970-71 to 55,820 in 1980-81. Enrolment will then increase to about 58,198 in 2005-06, although falling after 1995. The relevant data appear in Table II-5. During the 1970-80 period, enrolment in Grades 1-6 is expected to fall from 34,624 to 28,286. Between 1980-81 and 1990-91, 1-6 enrolment will increase and fall thereafter. Enrolment in Grades 7-12 will decline from 32,358 in 1970-71 to 28,760 students in 2005-06, having fallen to 27,524 in 1980-81.

The Central Region's share of total provincial primary and secondary enrolment is expected to fall from 15.9 per cent in 1970-71 to 13.6 per cent in 1980-81 to 9.5 per cent in 2005-06. Enrolment in Grades 1-6 will decrease from 15.1 to 13.6 to 9.4 per cent and in Grades 7-12 will fall from 16.8 to 13.4 to 9.6 per cent during the period.

Table II-6 shows that estimated enrolment in the Mountain Region in Grades 1-12 is expected to increase from 11,142 to 11,429 and to 16,612 from 1970-71 to 1980-81 and 2005-06. Enrolment in Grades 1-6 is expected to fall from 6,085 to 5,648, and then to rise to 8,470; in Grades 7-12, enrolment is expected to rise from 5,057 to 5,781 to 8,142 during the period. The region's share of total primary and secondary enrolment will rise from 2.6 to 2.8 per cent and then fall to 2.7 per cent. The share of provincial enrolment in Grades 1-6 will remain unchanged—2.7 per cent—throughout the forecast period, while the share of enrolment in Grades 7-12 will increase from 2.6 to 2.7 to 2.8 per cent from 1970-71 to 1980-81 and beyond.

A moderate increase in total primary and secondary school enrolment is expected in the Northern Region. Table II-7 shows that from a total of 59,420 students in 1970-71, enrolment should fall to 54,569 by 1980-81, and then rise to 70,428 in 2005-06. It is expected that the number of students in Grades 1-6 will decrease from 32,363 in 1970-71 to 26,017 in 1980-81, and then rise to 34,498 in 2005-06. Enrolment in Grades 7-12 will increase to 28,552 in 1980-81 from 27,057 in 1970-71, and reach 34,930 by 2005-06. The region's share of the provincial enrolment will decrease from 14.1 to 13.2 to 11.5 per cent during the period. The share of enrolment in Grades 1-6 is expected to fall from 14.1 to 12.5 to 11.3 per cent; the share in Grades 7-12 is expected to fall from 14.0 to 13.9 to 11.7 per cent of total provincial enrolment.

A substantial increase in enrolment is expected in the Calgary Region. The data in Table II-8 suggest that enrolment in Grades 1-12 will increase from 104,637 to 117,244 to 205,484 from 1970-71 to 1980-81 to 2005-06. Enrolment in Grades 1-6 for the same years is expected to rise from 59,590 to 60,216 and to 106,074. Enrolment in Grades 7-12 should rise from 45,047 in 1970-71 to 57,028 in 1980-81 and 99,410 in 2005-06. The region is expected to increase its share of total provincial enrolment in Grades 1-12 from 24.8 to 28.3 to 33.6 per cent. The shares of provincial enrolment in Grades 1-6 and Grades 7-12 are expected to rise from 25.9 to 28.9 to 33.9 per cent, and from 23.4 to 27.7 to 33.2 per cent, respectively.

Significant growth in primary and secondary school enrolment is also projected for the Edmonton Region. Table II-9 shows that enrolment in Grades 1-12 is expected to rise from 138,547 in 1970-71 to 141,943 in 1980-81 to 223,891 in 2005-06. Enrolment in Grades 1-6 can be expected to fall from 75,759 in 1970-71 to 71,714 in 1980-81, and then to increase to 114,751 by 2005-06. Enrolment in Grades 7-12 will grow from 62,788 in 1970-71 to 70,229 in 1980-81 and to 109,140 in 2005-06. The region's share of provincial enrolment in Grades 1-12 is expected to increase from 32.8 to 34.2 to 36.6 per cent. Shares of provincial enrolment in Grades 1-6 and 7-12 will grow from 33.0 to 34.4 to 36.7 per cent and from 32.6 to 34.1 to 36.5 per cent, respectively.

The data indicate that in 1980-81 nearly 63 per cent, and in 2005-06 more than 70 per cent, of primary and secondary school students will be enrolled in the Calgary and Edmonton Regions, while the other four regions will share the remaining 30-37 per cent.

Pre-School and Kindergarten Enrolment

Kindergarten enrolment is shown in Table II-10 as a percentage of 5 year-old population in Canada and the ten provinces. Actual percentages are provided for the school year 1967-68 and estimated percentages for the school year 1980-81 (see also Figure II-3). Percentages vary significantly from province to province. The Canadian average in 1967-68 was 63.0 per cent. Three provinces, Newfoundland, Ontario, and Nova Scotia, had rates that were considerably above the national average—71.3, 91.4 and 104.1 per cent, respectively. Rates for the remaining seven provinces were below the national average—New Brunswick 0.7 per cent, Prince Edward Island 1.7 per cent, Alberta 2.2 per cent, Saskatchewan 19.5 per cent, British Columbia 42.4 per cent, Manitoba 52.1 per cent, and Quebec 62.9 per cent. Thus, only two provinces — New Brunswick and Prince Edward Island—had lower participation rates than Alberta.[1]

The percentage of 5-year-old children in kindergartens in 1980-81 is expected to be much higher than in 1967-68. The average rate for Canada is expected to increase to 113.4 per cent. Two provinces, Ontario and Manitoba, are expected to have rates above the Canadian average while the rates for the other eight provinces are expected to be lower.

Projected participation rates follow in ascending order: Alberta 9.4 per cent, Saskatchewan 60.0 per cent, New Brunswick 71.9 per cent, Prince Edward Island 79.9 per cent, British Columbia 82.0 per cent, Manitoba 85.4 per cent, Newfoundland 86.0 per cent, Nova Scotia 105.3 per cent, Quebec 124.8 per cent, Ontario 153.8 per cent. Thus, Alberta is the only province without firm plans for a public kindergarten system and the extremely low projected participation rate in kindergarten programs in the province is a result of the continued absence of a publicly-supported program.

Actual and potential pre-school and kindergarten enrolments in Alberta during the period from 1956 to 2005 are shown in Table II-11. Beyond 1970 it is assumed that public kindergarten programs will be available so that by 1980-81 the 5-year-old participation rate in Alberta will reach the average Canadian rate in 1967-68 (63 per cent). Beyond 1980-81 the participation rate is assumed to increase to 101 per cent. The same participation rates are assumed for 3- and 4-year-olds, in order to estimate potential pre-school enrolment.

The number of children in the 3- to 4-year-old age group increased from 55,030 in 1956-57 to 58,901 in 1970-71, declining from 73,742 in 1966-67. The number of children in this age group is expected to rise to 80,189 by 1980-81 and to 109,905 in 2005-06.

The number of 5-year-old children increased from 27,456 in 1956-67 to 31,677 in 1970-71, having reached a level of 36,896 in 1966-67. It is expected to increase to 38,300 in 1980, and to 53,730 in 2005-06.

If public programs are instituted for 3-, 4-, and 5-year-olds, and the illustrative participation rates realized, pre-school enrolment would be in the neighborhood of 80,189 in 1980-81 and 111,004 in 2005-06. Corresponding figures for 5-year-old children in kindergarten are 24,129 by 1980-81 and 54,267 by 2005-06.

University Enrolment

Historic Growth

Table II-12 shows enrolment of full-time and part-time students at Alberta universities, by university and by level of study, from 1958-59 to 1969-70.

Total full-time enrolment increased from 5,433 in 1958-59 to 26,577 in 1969-70, a 5-fold increase. The University of Alberta has the largest enrolment of full-time students in the province. Its enrolment increased from 4,890 students in 1958-59 to 17,354 in 1969-70, an increase of slightly more than 250 per cent. This increase was smaller than that experienced by the group of all three universities in the province. As a result, The University of Alberta's share of provincial full-time university enrolment fell from 90 per cent in 1958-59 to 65.3 per cent in 1969-70.

Full-time enrolment at The University of Calgary increased from 543 students in 1958-59 to 7,962 in 1969-70. This represents an increase far in

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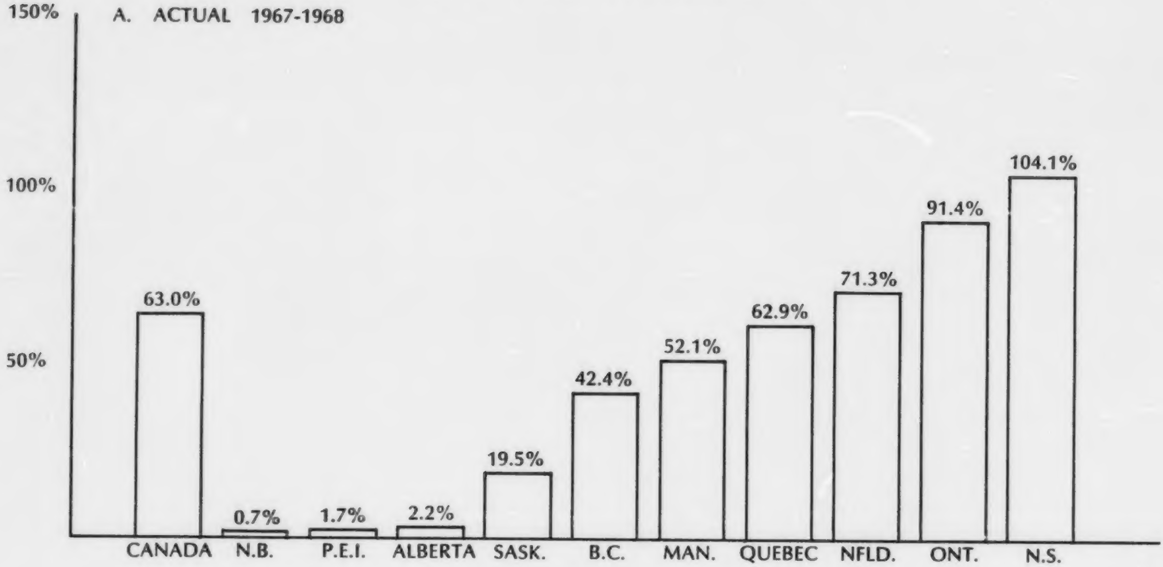
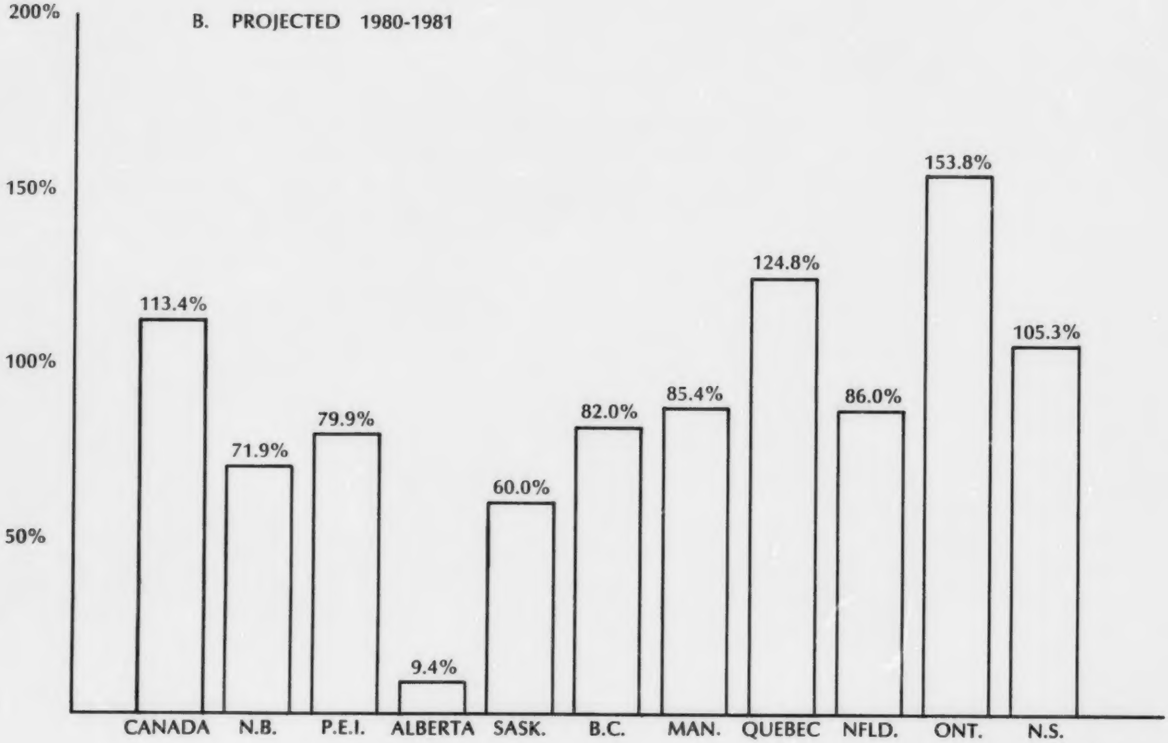
[1] Zsigmond and Wenaas, op. cit.

FIGURE II-3 ACTUAL AND PROJECTED KINDERGARTEN ENROLMENT AS PERCENTAGE OF FIVE-YEAR-OLDS CANADA AND BY PROVINCE


A. ACTUAL 1967-1968


B. PROJECTED 1980-1981

Source: Table II-10

excess of the provincial average increase in full-time university enrolment. Thus, the University's share increased from 10 per cent of the total full-time enrolment in 1958-59 to nearly 30 per cent in 1969-70 (see Table II-12).

Enrolment data at The University of Lethbridge indicate that the number of full-time students doubled between 1967-68 and 1969-70—from 638 to 1,261. The University's share of full-time provincial university enrolment rose from 3.4 to 4.7 per cent.

In the academic year 1958-59, enrolment of full-time **graduate** students at provincial universities was only 358 students, equivalent to 6.6 per cent of total full-time university enrolment. In 1969-70 the number of graduate students had increased to 2,878, 10.8 per cent of total full-time enrolment.

In 1958-59 all graduate enrolment was associated with The University of Alberta, whose 358 graduate students constituted 7.3 per cent of its total enrolment. Graduate enrolment at the University increased to 2,088 students in 1969-70, 12 per cent of the total enrolment.

Graduate instruction at The University of Calgary began in 1960-61 with 10 students, 1.0 per cent of the total full-time enrolment. Gradually, the number of graduate students increased to 790, equivalent to 10 per cent of the total full-time enrolment in 1969-70.

The University of Lethbridge is an undergraduate institution and is expected to remain so in the forseeable future.

Total **part - time** enrolment at provincial universities increased from 3,628 in 1958-59 to 13,736 in 1969-70, a 4-fold increase slightly less than the corresponding increase in full-time enrolment (see Table II-12).

Part-time enrolment at The University of Alberta increased between 1958-59 and 1969-70 from 3,354 to 7,469, a smaller increase than that experienced by the other universities in the province. As a result, the University of Alberta's share of part-time enrolment decreased from 93 to 54.4 per cent of the provincial total.

Enrolment of part-time students at The University of Calgary rose from 274 in 1958-59 to 5,253 in 1969-70. The University's share of the total provincial part-time university enrolment grew from 7.0 to 38.2 per cent during the period.

The University of Lethbridge had 331 part-time students in 1967-68 and 1,014 in 1969-70, a 3-fold increase during the 3-year period, 7.3 per cent of the part-time university enrolment in the province.

Most part-time students in the province were undergraduates. In 1958-59, only 181 part-time **graduate** students were enrolled at provincial universities, equivalent to 5 per cent of the total part-time university enrolment. The number of graduate part-time students increased to 1,264 in 1969-70, or 9.2 per cent of the total part - time enrolment.

Total university enrolment in Alberta, including both full and part-time students, grew from 9,061 students in 1958-59 (5,433 full-time and 3,628 part-time students) to 40,313 students in 1969-70 (26,577 full-time and 13,736 part-time students).

During this period, total enrolment at The University of Alberta increased from 8,244 (4,890 full-time and 3,354 part-time students) to 24,823 students (17,354 full-time and 7,469 part-time students). Enrolment at The University of Calgary rose from 817 (543 full-time and 274 part-time students). Enrolment at The University of Calgary 5,253 part-time). Enrolment at The University of Lethbridge increased from 969 students in 1967-68 (638 full-time and 331 part-time students) to 2,275 students in 1969-70 (1,261 full-time and 1,014 part-time students).

The ratio of part-time to full-time enrolment at provincial universities fell from 67 per cent in 1958-59 to 62 per cent in 1969-70. The respective ratios for The University of Alberta were 68 and 43 per cent and for The University of Calgary, 55 and 66 per cent. For The University of Lethbridge, the ratio of part-time to full-time enrolment was 52 per cent in 1967-68 and 80 per cent in 1969-70. These differential and fluctuating ratios make it difficult to establish a clear trend with regard to the relationship between full - time and part - time enrolment.

Projected Enrolment, 1980 and 2005

Looking to the future size requirements of educational facilities and services for university students, the determinants of university enrolment are much easier to identify than to quantify. University enrolment in the future will be a function of population, primarily in the 18-24 age group, but increasingly, perhaps, in the over-24 cohort.

Estimates of the number of persons in the 18-24 age group are available from previous population projections, so the final variable to decide upon is expected participation rates.

The Universities Commission, in projecting university enrolments through 1980-81, estimates a participation rate of 21.5 per cent of the 18-24 age group by the end of the period. Of this total, an 18.5 per cent participation rate is estimated for undergraduates and a 3 per cent rate for graduate enrolment.

On the basis of these participation rates, total full-time university enrolment in the Province of Alberta, based upon the Universities Commission's medium projections, is expected to increase from 30,095 students in 1970-71 to 58,615 in 1980-81[1] The number of undergraduates is expected to increase from 26,775 to 50,340, while the number of graduates is expected to increase two and a half times, from 3,320 in 1970-71 to 8,275 in 1980-81 (see Table II-13).

Total full-time enrolment at The University of Alberta and Athabasca University is expected to grow from 19,380 in 1970-71 to 35,525 in 1980-81. The number of undergraduates is expected to rise from 17,005 to 30,155, while graduate enrolment grows from 2,375 to 5,370.

At The University of Calgary, total full-time enrolment is projected to increase from 9,255 in 1970-71 to 20,300 in 1980-81. It is expected that undergraduate enrolment will increase from 8,310 to 17,395 students, more than double, while graduate full-time enrolment will increase from 945 students in 1970-71 to 2,905 students in 1980-81, more than triple.

Undergraduate full-time enrolment at The University of Lethbridge is expected to increase from 1,460 to 2,790.

Full-time graduate students as a percentage of total full-time enrolment in all universities is expected to increase from 11 in 1970-71 to 14.1 in 1980-81. At The University of Alberta and Athabasca University, the percentage of full-time graduate students is expected to increase from 12.2 to 15.1. At The University of Calgary, the percentage of graduate students is expected to rise from 10.2 to 14.3. The University of Lethbridge is expected to continue to provide undergraduate education only.

The estimated share of total full-time enrolment in provincial universities at The University of Alberta and Athabasca University is expected to decrease from 64.3 per cent in 1970-71 to 60.6 per cent in 1980-81. The University of Calgary's share is expected to rise from 30.7 to 34.6 per cent, while the share of The University of Lethbridge may show a small decrease, from 5 per cent in 1970-71 to 4.8 per cent in 1980-81.

Table II-14 and Figure II-4 show full-time enrolment projections at provincial universities from 1980-81 to 2005-06. The data consider alternative assumptions about the participation rates of the 18-24 age group. One projection assumes that the participation rate will remain constant at 21.5 per cent throughout the period. Alternatively, the assumption that will be used in this chapter is that the participation rate will increase gradually over time and attain the following values: 1980-81, 21.5 per cent; 1985-86, 23.5 per cent; 1990-91, 25.6 per cent; 1995-96, 28.1 per cent; 2000-01, 31 per cent; and 2005-06, 34.4 per cent.

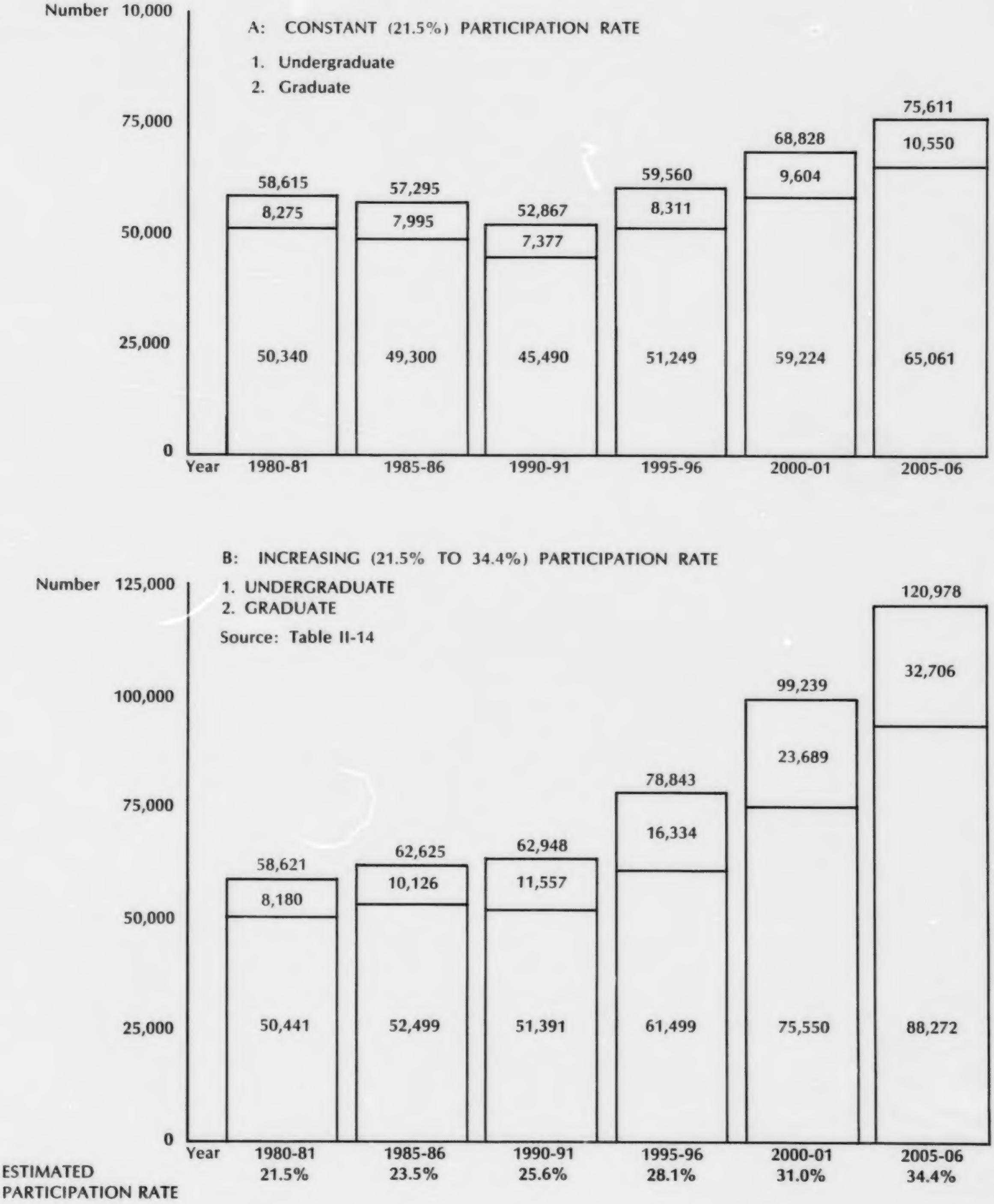
If the participation rate were to remain constant at 21.5 per cent, total full-time enrolment at provincial universities would rise from 58,615 students in 1980-81 to 75,611 students in 2005-06. Undergraduate enrolment, based on an 18.5 per cent participation rate, would rise from 50,340 to 65,061, and graduate enrolment, with a 3 per cent participation rate, from 8,275 to 10,550.

On the basis of the assumption made here—that the participation rate will increase over time—total full-time university enrolment is projected to rise from 58,621 in 1980-81 to 120,978 in 2005-06.

Undergraduate participation rates are estimated to increase from 18.5 to 25.1 per cent from 1980-81 to 2005-06. As a result, undergraduate enrolment will increase from 50,441 to 88,272 during the period.

Actual 1970-71 enrolment is lower than that included in the Commission's medium projection. This deviation, of course, may turn out to be short-term rather than long-term in nature.

FIGURE II-4 ESTIMATED FULL-TIME UNIVERSITY ENROLMENT 1980-2005



Source: Table II-14

Graduate participation rates are assumed to increase from 3 to 9.3 per cent during the period from 1980-81 to 2005-06. On the basis of these participation rates, graduate enrolment is projected to rise from 8,180 to 32,706 students.

While full-time enrolment projections are based on assumed participation rates and population levels, the projection of part-time enrolment is based on the relationship between current full-time and part-time enrolment at provincial universities. No time series data have been found that provide a statistical relationship consistent enough to be capable of producing part-time enrolment estimates with high confidence levels. Participation rates of part-time students in relationship to the 18-24 age group have fluctuated widely; so, for that matter, have the percentage relationships between full-time and part-time enrolment. Nevertheless, for purposes of projecting part-time enrolment and because no other significant predicting relationships have been established, part-time enrolment is projected on the basis of the same ratio between full-time and part-time enrolment that existed in 1969-70 throughout the university system.

Table II - 15 shows estimated part - time enrolment at provincial universities between 1970-71 and 1980-81. As noted above, projections are based on the relationship between part-time and full-time enrolment at provincial universities observed in the academic year 1969-70 — 52.6 per cent for undergraduate and 43.9 per cent for graduate enrolment.

On the basis of these assumed ratios and the projections of full-time enrolment, total part-time enrolment at provincial universities is expected to increase from 15,608 students in 1970-71 to 30,749 students in 1980-81. During the period, part-time undergraduate enrolment is expected to increase from 14,146 to 27,042 students and part-time graduate enrolment from 1,462 to 3,707 students.

Total part-time enrolment at the University of Alberta and Athabasca University is expected to grow from 8,334 in 1970-71 to 15,253 in 1980-81. The number of part-time undergraduate students is expected to increase from 7,363 to 13,057 and the number of part-time graduate students from 971 to 2,196.

The total number of part-time students at The University of Calgary is expected to rise from 6,100 in 1970-71 to 13,253 in 1980-81. The number of part-time undergraduates should increase from 5,609 to 11,742, and part-time graduates from 491 to 1,511.

Part-time enrolment at The University of Lethbridge can be expected to increase from 1,174 in 1970-71 to 2,243 in 1980-81.

Beyond 1980, total part-time enrolment at all universities in the province is estimated to grow from 30,749 students in 1980-81 to 60,789 students in 2005-06. This projection is based on the same relationship between full - time and part - time university enrolment as that assumed for the 1970-80 period.

The number of part-time undergraduate students is projected to increase from 27,042 to 46,431. Part-time graduate enrolment is projected to rise from 3,707 to 14,358 students between 1980-81 and 2005-06 (see Table II-16).

On the assumption that participation rates for full-time graduate and undergraduate students will increase gradually from 3 to 9.3 per cent and from 18.5 to 25.1 per cent respectively by 2005, the estimates for total university enrolment—part-time and full-time—in the province are as follows: 89,370 students in 1980-81; 94,684 in 1985-86; 95,054 in 1990-91; 118,366 in 1995-96; 149,377 in 2000-01; and 181,767 in 2005-06.

Undergraduate enrolment—full-time and part-time—will grow from 77,483 in 1980-81 to 80,113 in 1985-86, 78,423 in 1990-91, 93,844 in 1995-96, 115,289 in 2000-01, and 134,703 in 2005-06.

Graduate enrolment—full-time and part-time—would increase from 11,887 students in 1980-81 to 14,571 in 1985-86, 16,631 in 1990-91, 23,509 in 1995-96, 34,088 in 2000-01, and 47,064 in 2005-06.

Post-Secondary Non-University Enrolment

Enrolment to 1969-70

During the 1950's and 1960's the province turned to the task of providing educational opportunities beyond high school for those students whose interests and/or inclinations required post-secondary education separate from the university system. These needs include junior or community colleges, agricultural colleges, vocational and technical institutes, etc.

Post - secondary non - university enrolment increased more than 300 per cent from 1,599 students in 1951-52 to 6,948 in 1967-68. The percentage of post - secondary non - university enrolment to university enrolment fell from 53 in 1951-52 to less than 30 per cent in 1962-63, but then began to increase, reaching 35.3 per cent in 1967-68 (see Table II-17). The percentage of the 18-24 age group enrolled in post-secondary non-university full-time programs increased from 1.4 in 1956-57 to 2.2 in 1961-62 and 3.5 in 1966-67.

Projected Full-Time Enrolment

Projected full - time post - secondary non - university enrolment is expected to increase from 12,350 in 1970-71 to 27,600 in 1980-81 and 56,980 in 2005-06 (see Table II-18). The ratio of full-time post-secondary non-university enrolment to full-time university enrolment is expected to increase gradually from 41 per cent in 1970-71 to 47 per cent in 1980-81, according to the Economic Council of Canada study.[1]

Beyond 1980, it is assumed that the percentage relationship between non-university and university enrolment will remain constant at 47.[2]

The percentage of the 18-24 age group expected to enroll in part-time post-secondary non-university full-time programs is projected to rise from 6.4 in 1970-71 to 9.2 in 1975-76, 10.1 in 1980-81, 11.1 in 1985-86, 12.1 in 1990-91, 13.4 in 1995-96, 14.6 in 2000-01, and 16.2 in 2005-06. Thus, by 2005 it is expected that full-time university and non-university enrolment will include more than 50 per cent of persons in the 18-24 age group.[3]

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[1] Zsigmond and Wenaas, **op. cit.**

[2] The projections of total post-secondary enrolment postulate a ratio of about 2 to 1 in enrolment in universities in relation to post-secondary non-university institutions by 1980 and beyond. While this projection envisions an increase in non-university post-secondary enrolment relative to university enrolment, it may prove to be conservative with regard to the magnitude of the enrolment shift toward non-university institutions.

The Colleges Commission of the province projects non-university enrolment to 1975-76 at a higher level than the projections used here. The various sub-systems in higher education, to a large extent, have made independent projections of enrolment. Since different assumptions as to enrolment patterns are often used by the various sub-systems, inconsistencies frequently exist when the total enrolment pattern for higher education is projected. Accordingly, the Colleges Commission advocates a systems approach to enrolment projections for higher education, with subsequent "allocation" to sub-systems.

Projection of a total pool of students for higher education followed by a separation of this pool into various sub-system groups is the preferred Commission approach to the initial projection approach. A varied approach is used, depending on the term of the projection.

(1) To 12 years—primarily based on public and private school enrolments supplemented by an adult group calculated as a percentage of the pools arising from the elementary and secondary grades;

(2) To 20 years as above, but with population statistics on age groups, i.e., 18-24 year group, blended in from about the ninth year;

(3) To 30 years—as in (2), but with the projections beyond 20 years being related to total population projections.

The Commission method assesses available historical data as to total enrolment and enrolment patterns. This includes a consideration of high school graduates as a percentage of original Grade 1 enrolment and of the Grade 12 enrolment, number, and percentage of matriculants, sub-system enrolment patterns, adult enrolments, etc. Prior to the preparation of projected enrolments, careful consideration is given to new and emerging trends. Projections are based on historical data after new and emerging trends have been outlined.

The following elements are illustrations of emerging trends considered by the Commission:

(1) Attitude toward university education:
    (a) Prior to about 1940, an "elitist" approach to university education seemed to be the norm.
    (b) The 1940's, 1950's, and 1960's saw a period in which a university education was the goal for many.
    (c) There appears to be an emerging trend in which a university degree is no longer viewed as the "be-all" and "end-all" of education.

(2) Junior colleges are changing to community colleges with a resulting shift from an emphasis on university transfer programs to an emphasis on programs of a non-university nature.

(3) Second year university will be offered by non-university centres. This will increase the number of students transferring to university, but the increased size of the institutions will facilitate the offering of additional non - university programs, thus having the effect of increasing non-university enrolments.

(4) A decline of the "job-training" approach in the vocational high schools will shift specific job-training to the non-university post-secondary level.

Part-Time Post-Secondary Non-University Enrolment

No attempt is made here to project part-time post - secondary non - university enrolment into the future. This does not imply in any sense that part-time students at post-secondary non-university institutions are not an important element of the system. In fact, at vocational and technical institutes, part-time enrolment seems to be at least as large as full-time enrolment. A large part of the activity at these institutes appears to be essentially a part-time activity, in the sense that apprenticeship and other programs are designed to last just a few days or weeks.

At community colleges there is no reason to believe that part-time enrolment is essentially different, or will become different, than part-time enrolment at universities.

Without attempting to quantify part - time enrolment beyond the present, it should be noted that part-time enrolment will play a vital role in all forms of post-secondary education. As a form of adult continuing education for cultural as well as vocational purposes, part-time enrolment will provide the vehicle for massive adult participation in post-secondary education. Some part-time education will provide a cultural activity to occupy meaningfully the increased leisure time confidently predicted by many futurists. Some part-time activity will represent continuing vocational and technical training for persons otherwise employed full-time. For whatever reasons, it would appear certain that post-secondary facilities at all levels will be used increasingly in an adult, continuing, part-time educational context, beyond the part-time enrolment of the 18-24 age group.

Education For Non-Modal Groups

Non-modal groups refer to the set of persons, primarily in the 5-17 age group, who exist outside the pattern of ordinary characteristics and circumstances. The set includes the so-called mentally or physically handicapped, the low income economic classes, and the social classes often outside the mainstream of provincial life, by choice or necessity.

Exceptional Children (mentally retarded, speech and hearing defects, etc.)[1]

In a way that is necessarily non-rigorous, the availability of educational facilities for exceptional children is examined in this section. From this

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(5) New facilities under construction and planned for non-university post-secondary institutions, will enhance the image of these institutions and thus stimulate enrolment.

According to the Commission, the following non-university facilities are currently planned:

N.A.I.T.	6,500	student places by mid-1970's
S.A.I.T.	8,000	student places by mid-1970's
Agricultural and Vocational Colleges	1,500	student places by mid-1970's
Grande Prairie College	650	student places by 1972
Grant MacEwan Community College	5,000	student places by late 1970's
Red Deer College	1,500	student places by mid-1970's
Mount Royal College	5,000	student places by late 1970's
Lethbridge Community College	2,000	student places by mid-1970's
Medicine Hat College	650	student places by 1972

If the above spaces are fully utilized, an enrolment in excess of 30,000 by 1980 in non-university post-secondary education could be realized.

Use of the 18-24 age group does not imply that post-secondary education will be restricted to that age category. Participation rates and enrolment estimates are based on the 18-24 cohort because time series data on participation rates relate to this age group and consistent treatment requires its use for forward projections. Moreover, as continuing education for the over-24 age group grows, it is likely that it will continue to emphasize part-time participation. Liberal projections of part-time enrolment as a percentage of full-time enrolment are influenced by this expected increase in continuing adult education on a part-time basis. It is for this reason, among others, that the part-time full-time relationships were extended forward at the 1969-70 ratio rather than at the declining rate noted for the university system as a whole. (see Table II-16).

In analyzing educational problems for which there are existing programs the purposes of the analysis should be specified. The major objective of this section is to inquire whether or not existing programs have been carried to an appropriate level or whether the province should seriously consider making incremental funds available to finance expanded facilities for exceptional children. Clearly, the objective of the study is not to belittle current provincial efforts to provide necessary facilities for brief analysis, some notion of the dimension of the problem of exceptional children and institutional facilities for their assistance may be identifiable. The following model was used.

For the Edmonton and Calgary regions and the province as a whole, population in the 5-17 age group is quantified for 1970. In the Edmonton Region, the 5-17 age group represents 27.6 per cent of regional population, in the Calgary Region 28.3 per cent, and in the province as a whole, 30 per cent.

These population percentages are then applied to the 1969 population data for the cities of Edmonton and Calgary (as opposed to the regions) and to the province. From these data it is estimated that in the City of Edmonton about 113,189 persons are in the 5-17 age group; in the City of Calgary, 104,434; in the province, 445,239; in the province outside the cities of Calgary and Edmonton, 227,616.

From the Blair report on mental health in Alberta,[7] probability figures are derived with regard to the incidence of specified characteristics in the 5-17 population. According to the Blair report, about 2 per cent of the population may be expected to have some problem of mental retardation, about 2.6 per cent some speech and/or hearing problem, about .13 per cent some problem of vision, and about 2 per cent some problem of emotional disturbance. This provides a percentage control figure to apply to the 5-17 age group to derive what might be called a universe of expected special or exceptional students.

For example, as shown in Table II-19, in the city of Calgary, given this non-rigorous model, it could be expected that about 2,100 persons in the 5-17 age group would have some problem of mental retardation; actual enrolment in programs for the mentally retarded numbered 917 in 1969-70. Similarly, it could be expected that about 2,750 persons would have some speech and/or hearing problem; actual enrolment in special programs of this nature was 50. For vision problems the respective figures are 136 and 19 and for emotionally disturbed children, 2,089 and 82.

On the basis of this limited analysis, the data in Table II-19 suggest that existing programs for exceptional children fall far short of the requirement. The requirement, presumably, is imposed by the number of children for whom special programs are required, if they are to find a meaningful place in educational society and beyond. Program alternatives, in turn, must deal with problems of detection and diagnosis as well as treatment of exceptional children.

Table II-20 provides a more complete set of data for the province and the cities of Edmonton and Calgary pursuant to programs for exceptional children.

Economic and Social Obstacles To Secondary and Post-Secondary Education

A complete analysis of economic and social access by all income and social classes to secondary and post-secondary education would require a separate study. However, because of the importance of the problem and the growing concern with this area of analysis in the province, the following discussion may serve as a minor input to a more comprehensive analysis.

Distribution of Taxable Income in Alberta, 1967

Table II-21 represents an attempt to quantify the distribution of taxable income among income groups for 1967 income data. The table divides income recipients into nine income classes ranging from $1,000-and-under to $20,000-and-over. The data, from the Alberta Bureau of Statistics, show the

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exceptional children. The data used in this section are not as comprehensive as desired; rather, the study cited is used only for purposes of suggesting the possible existence of a serious problem. Other data, while differing in detail, might also be expected to indicate that the province still has some way to go in accommodating the special requirements of exceptional children. This is not to suggest that segregated facilities are always appropriate to the needs of exceptional children, but that homogeneous peer groups may be required for some kinds of special activities. In this last regard, it is important to note that the Department of Education data cited in this section do not necessarily include all the existing facilities that are available for, and appropriate to, the education of exceptional children.

[7] W. R. N. Blair, **Mental Health in Alberta: A Report on the Alberta Mental Health Study**, 1968.

number of taxable and non-taxable returns, from which is calculated the percentage of returns within each income class, by class and cumulatively. For example, in 1967, the $1,000-and-under group filed 12.4 per cent of all tax returns; the $1,000 - $2,000, 14.1 per cent; thus, the $2,000-and-under (lower 2 classes) were responsible for 26.5 per cent of 1967 returns.

Under the assumption that the average income accruing to the various classes was equal to the mid-point of each class, it is possible to estimate the total income accruing to each class. A difficulty arises because of the aggregation of several classes of income groups into a single class for the year 1967. To overcome this difficulty, it is assumed that the distribution of individuals in each class for 1967 is the same as 1963:

For the $ 5,000 - $7,000 group: 63 per cent of tax returns and taxpayers fall within the $5,000 - $6,000 group; 37 per cent fall into the $6,000 - $7,000 group.

For the $ 7,000 - $10,000 group: 50 per cent of returns and taxpayers fall within the $7,000 - $8,000 class; 30 per cent within the $8,000 - $9,000 class; and 20 per cent within the $9,000 - $10,000 class.

For the $10,000 - $20,000 group: 80 per cent fall within the $10,000 - $15,000 income interval and 20 per cent within the $15,000 - $19,999 class.

Given these simplifying assumptions, income can be allocated to the various groups. Given total taxable income, taxable income accruing to the $20,000-and-over group is residual.

On the basis of this simple model, it is estimated that the 12.4 per cent of taxpayers in the $1,000-and-under class received 1.4 per cent of the province's taxable income. The next lowest income class, $1,000 - $2,000, represented 14.1 per cent of total taxpayers and received 4.7 per cent of Alberta's taxable income. The two lowest groups, then, represented 26.5 per cent of provincial taxpayers and received 6.1 per cent of taxable income. Similarly, the $2,000 - $3,000 group accounted for 13.7 per cent of taxpayers in the province and received 7.6 per cent of taxable income. Thus, the $3,000-and-under group constituted 40.2 per cent of the taxpaying universe and received 13.7 per cent of the taxable income.

From the point of view of educational policy, even acknowledging the simplified nature of this income model, the question that comes inevitably to mind is what meaningful chances exist for children in these income groups to participate effectively in primary and secondary education? And, given the difficulties inherent in that problem, what are the probabilities of children from these income groups sharing on a proportionate basis in post-secondary education?

Economic and Social Determinants of Educational Opportunity

The problem of significant access to primary, secondary, and particularly post-secondary education has many dimensions beyond economic income classes or other economic variables. The whole set of economic and social determinants of educational opportunity has been analyzed in a series of Canadian studies, ranging from John Porter's **The Vertical Mosaic** to Robert Pike's study for the Association of Universities and Colleges of Canada, **Who Doesn't Get to University and Why.**[1]

In Pike's study, the author analyzes four major determinants of access to university — academic ability, social class, geographic location, and ethnic group. After noting some of the obvious differences in participation rates among provinces and between male and female matriculants, Pike calls attention to Porter's findings of a disproportionate number of students at university from higher occupational classes, higher income groups, and homes where the level of education of parents is relatively high.

Pike suggests that there may be a lowering of the "accessibility gap" between children of highly paid professionals and white collar workers and skilled manual workers, but that children of semiskilled and unskilled manual workers remain in the group least likely by far to continue their education beyond the minimal leaving age.

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[1] John Porter, **The Vertical Mosaic: An Analysis of Social Class and Power in Canada,** Toronto: The University of Toronto Press, 1965; Robert M. Pike, **Who Doesn't Get to University—and Why: A study on Accessibility to Higher Education in Canada,** Ottawa, printed by the Runge Press for the Association of Universities and Colleges of Canada, 1970.

Pike goes on to discuss several variables which create the atmosphere of an "accessibility gap:" cultural deprivation relating to home, family, and neighborhood environment; the tendency of schools to adhere to and promote middle-class values, which results in unconscious discrimination against lower income groups and minority classes; inequality in the provision of educational facilities, e.g., rural versus urban, and slum versus high income areas.

The fact that drop-outs from primary and secondary schools are disproportionately large from low income groups may be related both to economic circumstances and social circumstances such as the lack of motivation generated by a host of family and community factors, including peer group pressure.

Prior to his final discussion of systems of financial aids potentially useful in seeking solutions to the problem, Pike concludes that it is "more likely that the under-representation of young people from lower income homes amongst university students is primarily a consequence of those social factors which influence educational performance and selection during the course of primary and secondary schooling . . . than it is a result of a cost barrier imposed at the university entrance level".[1]

Interesting analogies to the Pike study were presented by the Metis Association of Alberta in its **Brief to Congress of the Future of Education:**[2]

> "Thus, aside from economic problems, native students face particularly in the secondary grades, a thoroughly threatening cultural context in the schools which works directly against their completing their secondary and even elementary education. Without completing at least some of the secondary grades, our students cannot go on to take advantage of the education available at Alberta's universities, junior colleges, technical and vocational colleges and technological institutes—post-secondary education which they and their people desperately need."

For example, the brief points out that among the parents of Lac La Biche area school children, for example, about half of the fathers and a third of the mothers had no formal education at all. Few of the others had gone beyond Grade Five.

Similarly, in the Lesser Slave Lake area only 66.3 per cent of school age children on reserves and in Metis colonies in the area were attending school in 1967 — a full 16 per cent below the Alberta average.

The Metis Association brief refers to the estimates that about 1,000 native youth between the ages of 12 and 25 reside in Edmonton. Among these native youth in Edmonton, there were

- —no Metis youth attending The University of Alberta
- —no Metis youth attending the Northern Alberta Institute of Technology
- —one attending nurses aide training school
- —one attending a beauty college
- —one attending a hair-dressing school
- —eight attending Alberta College.

"There were in 1969-70, 10,000 students from metropolitan Edmonton attending The University of Alberta. Not a single one was Metis. This is the measure of the failure of your education system."[1]

Primary and Secondary Schools in Rural Areas

The studies referred to above have noted some of the subtle economic and social difficulties involved in making Alberta's educational system accessible to all economic and social groups. Attention is called to one more difficulty. This is the complex problem of maintaining minimal standards of

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[1] **Ibid.**
By way of supplementary data, the 1969 Canada Year Book notes that there were in Alberta in 1969, 26 Indian students in university, 3 in nurses training, 155 in post-secondary vocational institutes, and 118 in post-secondary upgrading programs.

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[1] **Ibid.**, p. 114.

[2] The brief was presented at the Congress on the Future: Education, sponsored by the Commission on Educational Planning and the Human Resources Research Council, Dec. 3, 4, and 5, 1970, Edmonton.

primary and secondary education in rural areas, particularly in a province of declining rural areas.

The difficulty is essentially economic in nature, and relates to the cost and revenue structures of public schools in rural areas. The problem is two-fold. In the first instance, schools in rural areas will ordinarily find themselves on the high-cost portion of an average cost schedule for education. That is, the average cost of providing educational services will form the usual U-shaped curve, with the average cost declining as the size of the student body and community grows. Significant economies can be realized as the number of students in an educational plant increases, at least up to a fairly high population. The rural school in a declining region is often caught in the reverse trap—as the size of the community and the number of students decline, it costs a great deal more both on a per student and per capita basis to provide the educational opportunity. What usually occurs, as a result, is high costs per student and a quality variable that declines over time.[1]

Simultaneously with the cost phenomenon, the revenue of the community often declines with shifts in population and economic activity. The result is a tax burden that is frequently higher than average and an educational effort that must inevitably lead to quality decay. It is in this context that a provincial foundation plan is brought to bear on cost - revenue problems of declining rural areas. It should be carefully noted that this provincial foundation plan will usually result in an income transfer from growing urban to declining rural areas in an effort to stabilize the quality of education. The output of the rural schools will in all probability migrate, in some measure, to urban areas after termination of formal schooling. There remains the strong probability, however, that this income transfer will occur without significantly relieving the tax burden in the rural areas, explained partly, of course, by the relatively modest incomes earned in many rural regions.[1]

Another problem from the point of view of total educational systems relates to the comparative ability of rural school graduates to participate effectively in post-secondary educational opportunities.

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[1] Cf. Charles Benson, **The Economics of Public Education,** Boston, Houghton-Mifflin Co., 1961; N. W. Hansen, "Economy of Scale as a Cost Factor in Financing Public Schools," **National Tax Journal, XVII** (March 1964).

[1] Cf., D. Seastone, **An Economic Analysis of State Aid to School Districts in Colorado,** Technical Bulletin 95, Agricultural Experiment Station, Colorado State University, 1967.

TABLES, CHAPTER II

TABLE II-1

PRIMARY AND SECONDARY SCHOOL ENROLMENTS IN ALBERTA, 1950-1970

	1950 - 51		1955 - 56		1960 - 61		1965 - 66		1969 - 70	
Grade	Total	% of Total Enrolment	Total	% of Total Enrolment	Total	% of Total Enrolment	Total	% of Total Enrolment	Total	% of Total Enrolment
1	21,900	12.6	27,188	12.1	34,520	11.7	38,160	10.5	39,567	9.7
2	20,085	11.5	25,906	11.6	31,765	10.8	36,507	10.1	37,850	9.3
3	18,730	10.7	26,428	11.8	30,346	10.3	34,708	9.6	37,445	9.2
4	17,668	10.2	23,065	10.3	28,166	9.6	33,650	9.3	36,991	9.0
5	16,884	9.7	20,372	9.1	27,070	9.2	33,779	9.3	36,599	8.9
6	15,770	9.1	20,103	9.0	26,019	8.8	32,270	8.9	35,375	8.6
1-6	111,037	63.8	143,062	63.9	177,886	60.4	209,074	57.7	223,827	54.7
7	15,245	8.8	19,810	8.8	26,409	9.0	31,498	8.7	34,851	8.5
8	13,786	7.9	17,412	7.8	25,042	8.5	29,118	8.1	33,482	8.2
9	11,713	6.7	15,593	7.0	21,757	7.4	27,618	7.6	32,667	8.0
7-9	40,744	23.4	52,815	23.6	73,208	24.9	88,234	24.4	101,000	24.7
10	9,084	5.2	11,724	5.2	16,097	5.5	22,696	6.3	30,837	7.5
11	6,865	3.8	9,028	4.0	14,021	4.8	20,374	5.6	26,631	6.5
12	6,239	3.6	7,320	3.3	13,223	4.4	21,781	6.0	27,138	6.6
10-12	22,188	12.8	28,072	12.5	43,341	14.7	64,851	17.9	84,606	20.6
Total	173,969	100.0	223,949	100.0	294,435	100.0	362,159	100.0	409,433	100.0

Source: Department of Education, Government of Alberta

TABLE II-2

PRIMARY AND SECONDARY SCHOOL ENROLMENT BY REGION, 1956 to 1970

	Southern Region			Central Region			Mountain Region			Northern Region		
Academic Year	Grades 1-6	Grades 7-12	Grades 1-12	Grades 1-6	Grades 7-12	Grades 1-12	Grades 1-6	Grades 7-12	Grades 1-12	Grades 1-6	Grades 7-12	Grades 1-12
1956-57 Enrolment	19,384	11,087	30,471	32,655	18,677	51,332	4,176	2,388	6,564	25,200	14,413	39,613
% of total prov. enrolment in applicable grade	13.0	13.0	13.0	21.9	21.9	21.9	2.8	2.8	2.8	16.9	16.9	16.9
1961-62 Enrolment	21,974	14,642	36,616	32,716	23,132	57,848	5,170	3,445	8,615	26,776	17,841	44,617
% of total prov. enrolment	11.9	11.9	11.9	18.8	18.8	18.8	2.8	2.8	2.8	14.5	14.5	14.5
% change, 1956-57 to 1961-62	13.4	32.1	20.2	6.3	23.9	12.7	23.8	44.3	31.2	6.3	23.8	12.6
1966-67 Enrolment	22,158	16,623	38,781	36,007	27,012	63,019	5,753	4,316	10,069	29,615	22,217	51,832
% of total prov. enrolment	10.4	10.4	10.4	16.9	16.9	16.9	2.7	2.7	2.7	13.9	13.9	13.9
% change, 1961-62 to 1966-67	.08	13.6	5.9	3.7	16.8	8.9	11.3	25.3	16.9	10.6	24.5	16.2
1969-70 Enrolment	20,816	19,489	40,305	33,798	30,625	64,423	5,820	4,826	10,646	31,783	25,614	57,397
% of total prov. enrolment	9.3	10.5	9.8	15.1	16.5	15.7	2.6	2.6	2.6	14.2	13.8	14.0
% change, 1966-67 to 1969-70[1]	(6.1)	17.2	3.9	(6.1)	13.4	2.2	1.2	11.8	5.7	7.3	15.3	10.7

	Calgary Region			Edmonton Region			Total Province		
Academic Year	Grades 1-6	Grades 7-12	Grades 1-12	Grades 1-6	Grades 7-12	Grades 1-12	Grades 1-6	Grades 7-12	Grades 1-12
1956-57 Enrolment	27,585	15,777	43,362	40,111	22,944	63,055	149,111	85,286	234,397
% of total prov. enrolment in applicable grades	18.5	18.5	18.5	26.9	26.9	26.9	100.0	100.0	100.0
1961-62 Enrolment	40,810	27,193	68,003	55,213	36,790	92,003	184,659	123,043	307,702
% of total prov. enrolment	22.1	22.1	22.1	29.9	29.9	29.9	100.0	100.0	100.0
% change, 1956-57 to 1961-62	47.9	72.4	56.8	37.6	60.3	45.9	23.8	44.3	31.3
1966-67 Enrolment	51,347	38,520	89,867	68,179	51,147	119,326	213,059	159,835	372,894
% of total prov. enrolment	24.1	24.1	24.1	32.0	32.0	32.0	100.0	100.0	100.0
% change, 1961-62 to 1966-67	25.8	41.7	32.2	23.5	39.0	29.7	15.4	29.9	21.2
1969-70 Enrolment	57,971	45,473	103,444	73,639	59,579	133,218	223,827	185,606	409,433
% of total prov. enrolment	25.9	24.5	25.3	32.9	32.1	32.5	100.0	100.0	100.0
% change, 1966-67 to 1969-70	12.9	18.1	15.1	8.0	16.5	11.6	5.1	16.1	9.8

[1] (decrease)

Source: Department of Education, Government of Alberta

TABLE II-3

ESTIMATED PRIMARY AND SECONDARY SCHOOL ENROLMENTS IN ALBERTA, 1970 - 2005

	1970-71	1975-76	1980-81	1985-86	1990-91	1995-96	1999-2000	2005-06
Grades 1-6 (Ages 6-11)								
Estimated Population	220,742	196,106	202,604	238,558	272,974	291,393	295,487	309,892
Estimated Participation Rates (per cent)	104.1	103.4	102.9	102.4	102.0	101.5	101.0	101.0
Estimated Enrolment	229,794	202,774	208,478	244,284	278,437	295,764	298,442	312,990
Grades 7-12 (Ages 12-17)								
Estimated Population	199,672	230,405	206,952	202,148	235,915	271,973	291,196	300,482
Estimated Participation Rates (per cent)	96.6	99.6	99.6	99.6	99.6	99.6	99.6	99.6
Estimated Enrolment	192,884	228,561	206,124	201,340	234,972	270,884	290,032	299,281
Grades 1-12 (Ages 6-17)								
Estimated Population[1]	420,414	426,511	409,556	440,706	508,889	563,366	586,683	610,374
Estimated Enrolment[2]	422,678	431,335	414,602	445,624	513,409	566,648	588,474	612,271
Grades 1-6 as Per cent of Total Enrolment	54.4	47.0	50.3	54.8	54.2	52.2	50.4	51.1
Grades 7-12 as Per cent of Total Enrolment	45.6	53.0	49.7	45.2	45.8	47.8	49.6	48.9

[1,2] Derived from calculations for Grades 1-6 and 7-12.

Source: Calculated from various sources, including Alberta Oil and Gas Conservation Board and Zsigmond and Wenaas, **Enrolment in Educational Institutions by Province, 1951-52 to 1980-81**, Economic Council of Canada, Staff Study No. 25, 1970.

TABLE II-4

ESTIMATED PRIMARY AND SECONDARY SCHOOL ENROLMENTS, SOUTHERN REGION, 1970 - 2005

	1970-71	1975-76	1980-81	1985-86	1990-91	1995-96	1999-2000	2005-06
Grades 1-6 (Ages 6-11)								
Estimated Population	20,531	16,518	16,120	18,845	20,587	20,324	19,196	18,573
Estimated Participation Rates (per cent)	104.1	103.4	102.9	102.4	102.0	101.5	101.0	101.0
Estimated Enrolment	21,373	17,080	16,587	19,297	20,999	20,629	19,388	18,759
Per cent of Total Provincial Enrolment in Grades 1-6	9.3	8.4	8.0	7.9	7.5	7.0	6.5	6.0
Grades 7-12 (Ages 12-17)								
Estimated Population	21,301	25,575	17,078	15,463	18,065	20,144	20,425	18,975
Estimated Participation Rates (per cent)	96.6	99.6	99.6	99.6	99.6	99.6	99.6	99.6
Estimated Enrolment	20,577	25,370	17,010	15,401	17,993	20,063	20,343	18,899
Per cent of Total Provincial Enrolment in Grades 7-12	10.7	11.1	8.3	7.7	7.7	7.4	7.3	6.3
Grades 1-12 (Ages 6-17)								
Estimated Population[2]	41,832	42,093	33,198	34,308	38,652	40,468	39,621	37,548
Estimated Enrolment[3]	41,950	42,450	33,597	34,698	38,992	40,692	39,731	37,658
Per cent of Total Provincial Enrolment in Grades 1-12	9.9	9.8	8.1	7.8	7.6	7.2	6.6	6.2

[1,2] Derived from calculations for Grades 1-6 and 7-12.

[2,3] Derived from calculations for Grades 1-6 and 7-12.

Source: Calculated from various sources, including Alberta Oil and Gas Conservation Board and Zsigmond and Wenaas, **op. cit.**

TABLE II-5

ESTIMATED PRIMARY AND SECONDARY SCHOOL ENROLMENTS, CENTRAL REGION[1], 1970 - 2005

	1970-71	1975-76	1980-81	1985-86	1990-91	1995-96	1999-2000	2005-06
Grades 1-6 (Ages 6-11)								
Estimated Population	33,260	27,903	27,499	30,954	32,811	32,040	30,202	29,147
Estimated Participation Rates (per cent)	104.1	103.4	102.9	102.4	102.0	101.5	101.0	101.0
Estimated Enrolment	34,624	28,852	28,286	31,697	33,467	32,521	30,504	29,438
Per cent of Total Provincial Enrolment in Grades 1-6	15.1	14.2	13.6	13.0	12.0	11.0	10.2	9.4
Grades 7-12 (Ages 12-17)								
Estimated Population	33,497	32,422	27,635	25,470	28,967	31,264	31,316	28,875
Estimated Participation Rates (per cent)	96.6	99.2	99.6	99.6	99.6	99.6	99.6	99.6
Estimated Enrolment	32,358	32,163	27,524	25,365	28,851	31,139	31,191	28,760
Per cent of Total Provincial Enrolment in Grades 7-12	16.8	14.1	13.4	12.6	12.3	11.5	10.8	9.6
Grades 1-12 (Ages 6-17)								
Estimated Population[2]	66,757	60,325	55,134	56,424	61,778	63,304	61,518	58,022
Estimated Enrolment[3]	66,982	61,015	55,820	57,065	62,318	63,660	61,695	58,198
Per cent of Total Provincial Enrolment in Grades 1-12	15.9	14.2	13.5	12.8	12.1	11.2	10.3	9.5

[1] Central Region includes Census Divisions 4, 5, 7, 8 and 10.

[2,3] Derived from calculations for Grades 1-6 and 7-12.

Source: Calculated from various sources, including Alberta Oil and Gas Conservation Board and Zsigmond and Wenaas, **op. cit.**

TABLE II-6

ESTIMATED PRIMARY AND SECONDARY SCHOOL ENROLMENTS, MOUNTAIN REGION[1], 1970 - 2005

	1970-71	1975-76	1980-81	1985-86	1990-91	1995-96	1999-2000	2005-06
Grades 1-6 (Ages 6-11)								
Estimated Population	5,845	5,396	5,489	6,332	7,186	7,729	7,935	8,386
Estimated Participation Rates (per cent)	104.1	103.4	102.9	102.4	102.0	101.5	101.0	101.0
Estimated Enrolment	6,085	5,579	5,648	6,484	7,333	7,845	8,014	8,470
Per cent of Total Provincial Enrolment in Grades 1-6	2.7	2.8	2.7	2.7	2.6	2.7	2.7	2.7
Grades 7-12 (Ages 12-17)								
Estimated Population	5,235	6,067	5,804	5,592	6,382	7,262	7,796	8,175
Estimated Participation Rates (per cent)	96.6	99.6	99.6	99.6	99.6	99.6	99.6	99.6
Estimated Enrolment	5,057	6,018	5,781	5,570	6,356	7,233	7,765	8,142
Per cent of Total Provincial Enrolment in Grades 7-12	2.6	2.6	2.8	2.8	2.7	2.7	2.7	2.7
Grades 1-12 (Ages 6-17)								
Estimated Population[2]	11,080	11,463	11,293	11,924	13,568	14,991	15,731	16,561
Estimated Enrolment[3]	11,142	11,597	11,429	12,054	13,689	15,078	15,779	16,612
Per cent of Total Provincial Enrolment in Grades 1-12	2.6	2.7	2.8	2.7	2.7	2.7	2.6	2.7

[1] Mountain Region includes Census Divisions 9 and 14.

[2,3] Derived from calculations for Grades 1-6 and 7-12.

Source: Calculated from various sources, including Alberta Oil and Gas Conservation Board and Zsigmond and Wenaas, **op. cit.**

TABLE II-7

ESTIMATED PRIMARY AND SECONDARY SCHOOL ENROLMENTS, NORTHERN REGION[1], 1970 - 2005

	1970-71	1975-76	1980-81	1985-86	1990-91	1995-96	1999-2000	2005-06
Grades 1-6 (Ages 6-11)								
Estimated Population	31,088	26,987	25,284	29,401	33,501	35,814	35,066	35,147
Estimated Participation Rates (per cent)	104.1	103.4	102.9	102.4	102.0	101.5	101.0	101.0
Estimated Enrolment	32,363	27,905	26,017	30,107	34,171	36,351	35,417	35,498
Per cent of Total Provincial Enrolment in Grades 1-6	14.1	13.8	12.5	12.3	12.3	12.3	11.9	11.3
Grades 7-12 (Ages 12-17)								
Estimated Population	28,009	31,010	28,667	24,606	28,527	32,741	35,114	35,070
Estimated Participation Rates (per cent)	96.6	99.6	99.6	99.6	99.6	99.6	99.6	99.6
Estimated Enrolment	27,057	30,762	28,552	24,508	28,413	32,610	34,974	34,930
Per cent of Total Provincial Enrolment in Grades 7-12	14.0	13.5	13.9	12.2	12.1	12.0	12.1	11.7
Grades 1-12 (Ages 6-17)								
Estimated Population[2]	59,097	57,997	53,951	54,007	62,028	68,555	70,180	70,217
Estimated Enrolment[3]	59,420	58,667	54,569	54,615	62,584	68,961	70,391	70,428
Per cent of Total Provincial Enrolment in Grades 1-12	14.1	13.6	13.2	12.3	12.2	12.2	12.0	11.5

[1] Northern Region includes Census Divisions 12,13 and 15.

[2,3] Derived from calculations for Grades 1-6 and 7-12.

Source: Calculated from various sources, including Alberta Oil and Gas Conservation Board and Zsigmond and Wenaas, **op. cit.**

TABLE II-8

ESTIMATED PRIMARY AND SECONDARY SCHOOL ENROLMENTS, CALGARY REGION[1], 1970 - 2005

	1970-71	1975-76	1980-81	1985-86	1990-91	1995-96	1999-2000	2005-06
Grades 1-6 (Ages 6-11)								
Estimated Population	57,243	53,122	58,619	70,620	83,360	92,032	96,463	105,024
Estimated Participation Rates (per cent)	104.1	103.4	102.9	102.4	102.0	101.5	101.0	101.0
Estimated Enrolment	59,590	54,598	60,216	72,315	85,027	93,412	97,428	106,074
Per cent of Total Provincial Enrolment in Grades 1-6	25.9	27.1	28.9	29.6	30.5	31.6	32.7	33.9
Grades 7-12 (Ages 12-17)								
Estimated Population	46,632	59,982	57,257	60,073	71,377	84,395	92,539	99,809
Estimated Participation Rates (per cent)	96.6	99.6	99.6	99.6	99.6	99.6	99.6	99.6
Estimated Enrolment	45,047	59,502	57,028	59,833	71,092	84,057	92,169	99,410
Per cent of Total Provincial Enrolment in Grades 7-12	23.4	26.0	27.7	29.7	30.3	31.0	31.8	33.2
Grades 1-12 (Ages 6-17)								
Estimated Population[2]	103,875	113,104	115,776	130,693	154,737	176,427	189,002	204,833
Estimated Enrolment[3]	104,637	114,430	117,244	132,148	156,119	177,469	189,597	205,484
Per cent of Total Provincial Enrolment in Grades 1-12	24.8	26.5	28.3	30.0	30.4	31.3	32.2	33.6

[1] Calgary Region includes Census Division 6.

[2,3] Derived from calculations for Grades 1-6 and 7-12.

Source: Calculated from various sources, including Alberta Oil and Gas Conservation Board and Zsigmond and Wenaas, **op. cit.**

TABLE II-9

ESTIMATED PRIMARY AND SECONDARY SCHOOL ENROLMENTS, EDMONTON REGION[1], 1970 - 2005

	1970-71	1975-76	1980-81	1985-86	1990-91	1995-96	1999-2000	2005-06
Grades 1-6 (Ages 6-11)								
Estimated Population	72,775	66,180	69,693	82,406	95,529	103,454	106,625	113,615
Estimated Participation Rates (per cent)	104.1	103.4	102.9	102.4	102.0	101.5	101.0	101.0
Estimated Enrolment	75,759	68,430	71,714	84,384	97,440	105,006	107,691	114,751
Per cent of Total Provincial Enrolment in Grades 1-6	33.0	33.7	34.4	34.5	35.0	35.5	36.1	36.7
Grades 7-12 (Ages 12-17)								
Estimated Population	64,998	75,349	70,511	70,944	82,597	96,167	104,006	109,578
Estimated Participation Rates (per cent)	96.6	99.6	99.6	99.6	99.6	99.6	99.6	99.6
Estimated Enrolment	62,788	74,746	70,229	70,660	82,267	95,782	103,590	109,140
Per cent of Total Provincial Enrolment in Grades 7-12	32.6	32.7	34.1	35.1	35.0	35.4	35.7	36.5
Grades 1-12 (Ages 6-17)								
Estimated Population[2]	137,773	141,529	140,204	153,350	178,126	199,621	210,631	223,193
Estimated Enrolment[3]	138,547	143,176	141,943	155,044	179,707	200,788	211,281	223,891
Per cent of Total Provincial Enrolment in Grades 1-12	32.8	33.2	34.2	34.8	35.0	35.4	35.3	36.6

[1] Edmonton Region includes Census Division 11.

[2,3] Derived from calculations for Grades 1-6 and 7-12.

Source: Calculated from various sources, including Alberta Oil and Gas Conservation Board and Zsigmond and Wenaas, **op. cit.**

TABLE II-10

KINDERGARTEN ENROLMENT AS PERCENTAGE OF FIVE-YEAR-OLD POPULATION, CANADA AND BY PROVINCE

	Actual 1967-68	Projected 1980-81
New Brunswick	0.7	71.9
Prince Edward Island	1.7	79.9
Alberta	2.2	9.4
Saskatchewan	19.5	60.0
British Columbia	42.4	82.0
Manitoba	52.1	85.4
Quebec	62.9	124.8
Newfoundland	71.3	86.0
Ontario	91.4	153.8
Nova Scotia	104.1	105.3
Canada	63.0	113.4

Source: Zsigmond and Wenaas, **op. cit.**

TABLE II-11

ACTUAL AND POTENTIAL PRE-SCHOOL AND KINDERGARTEN ENROLMENT, ALBERTA, 1956 - 2005

	Population		Participation Rate	Enrolment	
	3-4 Years	5 Years		3-4 Years	5 Years
1956-57	55,030	27,456	2.7	1,486	741
1961-62	68,425	33,402	1.9	1,300	635
1966-67	73,742	36,896	2.0	1,475	738
1970-71	58,901	31,677	4.0	2,356	1,267
1975-76	67,012	32,085	32.0	21,444	10,267
1980-81	80,189	38,300	63.0	50,519	24,129
1985-86	91,151	44,337	70.0	63,806	31,036
1990-91	95,741	47,720	77.0	73,721	36,744
1995-96	97,310	48,438	85.0	82,714	41,172
1999-2000	100,055	49,494	91.4	91,450	45,238
2005-06	109,905	53,730	101.0	111,004	54,267

Source: Zsigmond and Wenaas, **op. cit.**; beyond 1966-67 increasing participation rates are assumed and enrolment figures calculated accordingly.

TABLE II-12

ENROLMENT AT ALBERTA UNIVERSITIES, BY UNIVERSITY AND BY LEVEL OF STUDY, 1958 - 1970

	1958-59	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70
Full-Time Students[1]												
Alberta												
Undergraduate	4,532	4,900	5,511	6,198	6,791	7,451	8,394	9,149	10,207	11,478	13,383	15,266
Graduate	358	437	557	610	626	734	940	1,125	1,282	1,549	1,799	2,088
Total	4,890	5,337	6,068	6,808	7,417	8,185	9,334	10,274	11,489	13,027	15,182	17,354
Calgary												
Undergraduate	543	684	1,072	1,432	1,714	2,048	2,471	3,070	3,774	4,521	6,142	7,172
Graduate	—	—	10	11	18	60	116	198	334	459	628	790
Total	543	684	1,082	1,443	1,732	2,108	2,587	3,268	4,108	4,980	6,770	7,962
Lethbridge[2]												
Undergraduate	—	—	—	—	—	—	—	—	—	638	1,024	1,261
Total												
Undergraduate	5,075	5,584	6,583	7,630	8,505	9,499	10,865	12,219	13,981	16,637	20,549	23,699
Graduate	358	437	567	621	644	794	1,056	1,323	1,616	2,008	2,427	2,878
Total	5,433	6,021	7,150	8,251	9,149	10,293	11,921	13,542	15,597	18,645	22,976	26,577
Part-Time Students[3]												
Alberta												
Undergraduate	3,173	3,742	4,079	4,330	4,161	4,747	5,184	5,298	5,827	5,438	6,106	6,616
Graduate	181	189	198	212	265	330	482	521	627	719	794	853
Total	3,354	3,931	4,277	4,542	4,426	5,077	5,666	5,819	6,454	6,157	6,900	7,469
Calgary												
Undergraduate	274	197	321	1,266	1,699	2,040	2,645	2,675	3,070	3,167	3,864	4,842
Graduate	—	—	—	—	40	17	39	118	123	238	378	411
Total	274	197	321	1,266	1,739	2,057	2,684	2,793	3,193	3,405	4,242	5,253
Lethbridge[2]												
Undergraduate	—	—	—	—	—	—	—	—	—	331	726	1,014
Total												
Undergraduate	3,447	3,939	4,400	5,596	5,860	6,787	7,829	7,973	8,897	8,936	10,696	12,472
Graduate	181	189	198	212	305	347	521	639	750	957	1,172	1,264
Total	3,628	4,128	4,598	5,808	6,165	7,134	8,350	8,612	9,647	9,893	11,868	13,736

[1] Full-time students are as defined by The University and College Assistance Act.

[2] Lethbridge figures exclude spring semester enrolments.

[3] Part-time students include those registered in day programs, evening programs, and summer session.

Source: Alberta Universities Commission.

TABLE II-13

ESTIMATED FULL-TIME ENROLMENT, ALBERTA UNIVERSITIES, 1970 - 1980

	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Alberta and Athabasca											
Undergraduate	17,005	18,865	20,695	22,550	24,080	25,330	26,550	27,695	28,720	29,510	30,155
Graduate	2,375	2,665	2,980	3,295	3,615	3,935	4,235	4,545	4,840	5,115	5,370
Total	19,380	21,530	23,675	25,845	27,695	29,265	30,785	32,240	33,560	34,625	35,525
Calgary											
Undergraduate	8,310	9,340	10,620	12,105	13,130	14,045	14,890	15,605	16,325	16,895	17,395
Graduate	945	1,100	1,270	1,450	1,635	1,840	2,040	2,255	2,465	2,690	2,905
Total	9,255	10,440	11,890	13,555	14,765	15,885	16,930	17,860	18,790	19,585	20,300
Lethbridge											
Undergraduate	1,460	1,620	1,800	2,025	2,170	2,275	2,390	2,490	2,605	2,690	2,790
Total											
Undergraduate	26,775	29,825	33,115	36,680	39,380	41,650	43,830	45,790	47,650	49,095	50,340
Graduate	3,320	3,765	4,250	4,745	5,250	5,775	6,275	6,800	7,305	7,805	8,275
Total	30,095	33,590	37,365	41,425	44,630	47,425	50,105	52,590	54,955	56,900	58,615

Source: Alberta Universities Commission.

TABLE II-14

ESTIMATED FULL-TIME ENROLMENT, ALBERTA UNIVERSITY SYSTEM, 1980 - 2005

	1980-81	1985-86	1990-91	1995-96	2000-01	2005-06
Constant (21.5%) Participation Rate						
Undergraduate	50,340	49,300	45,490	51,249	59,224	65,061
Graduate	8,275	7,995	7,377	8,311	9,604	10,550
Total	58,615	57,295	52,867	59,560	68,828	75,611
Increasing (21.5% to 34.4%) Participation Rate[1]						
Estimated Participation Rate	21.5%	23.5%	25.6%	28.1%	31.0%	34.4%
Undergraduate	50,441	52,499	51,391	61,499	75,550	88,272
Graduate	8,180	10,126	11,557	16,334	23,689	32,706
Total	58,621	62,625	62,948	78,843	99,239	120,978

[1] Undergraduate participation rates are estimated to increase from 18.5% to 19.7%, 20.9%, 22.2%, 23.6%, and 25.1% from 1980-81 to 2005-06; graduate rates from 3.0% to 3.8%, 4.7%, 5.9%, 7.4%, and 9.3%.

Source: Calculated.

TABLE II-15

ESTIMATED PART-TIME ENROLMENT, ALBERTA UNIVERSITIES, 1970 - 1980

	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Alberta and Athabasca											
Undergraduate	7,363	8,169	8,961	9,764	10,427	10,968	11,496	11,992	12,436	12,778	13,057
Graduate	971	1,090	1,219	1,348	1,479	1,609	1,732	1,859	1,980	2,092	2,196
Total	8,334	9,259	10,180	11,112	11,906	12,577	13,228	13,851	14,416	14,870	15,253
Calgary											
Undergraduate	5,609	6,305	7,169	8,171	8,863	9,480	10,051	10,533	11,019	11,404	11,742
Graduate	491	572	660	754	850	957	1,061	1,173	1,282	1,399	1,511
Total	6,100	6,877	7,829	8,925	9,713	10,437	11,112	11,706	12,301	12,803	13,253
Lethbridge											
Undergraduate	1,174	1,302	1,447	1,628	1,745	1,829	1,922	2,002	2,094	2,163	2,243
Total											
Undergraduate	14,146	15,776	17,577	19,563	21,035	22,277	23,469	24,527	25,549	26,345	27,042
Graduate	1,462	1,662	1,879	2,102	2,329	2,566	2,793	3,032	3,262	3,491	3,707
Total	15,608	17,438	19,456	21,665	23,364	24,843	26,262	27,559	28,811	29,836	30,749

Source: Calculated.

TABLE II-16

ESTIMATED PART-TIME ENROLMENT, ALBERTA UNIVERSITY SYSTEM, 1980 - 2005

	1980-81	1985-86	1990-91	1995-96	2000-01	2005-06
Undergraduate	27,042	27,614	27,032	32,345	39,739	46,431
Graduate	3,707	4,445	5,074	7,175	10,399	14,358
Total	30,749	32,059	32,106	39,523	50,138	60,789

Source: Calculated.

TABLE II-17

POST-SECONDARY NON-UNIVERSITY FULL-TIME ENROLMENT, 1951 - 1968

	1951-52	1956-57	1957-58	1958-59	1959-60	1960-61	1961-62
University Enrolment	3,015	4,277	4,696	5,499	6,215	7,268	8,499
Post-Secondary Non-University Enrolment	1,599	1,656	1,971	2,026	2,267	2,486	2,729
Post-Secondary Non-University Enrolment as Per cent of University Enrolment	53.0	38.7	42.0	36.8	36.5	34.2	32.1
Post-Secondary Non-University Enrolment as Per cent of 18-24 Age Group		1.4					2.2

	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68
University Enrolment	9,837	11,079	12,977	14,749	16,983	19,688
Post-Secondary Non-University Enrolment	2,923	3,411	4,049	4,624	5,312	6,948
Post-Secondary Non-University Enrolment as Per cent of University Enrolment	29.7	30.8	31.2	31.4	31.3	35.3
Post-Secondary Non-University Enrolment as Per cent of 18-24 Age Group					3.5	

Source: Zsigmond and Wenaas, **op. cit.**

TABLE II-18

PROJECTED POST-SECONDARY NON-UNIVERSITY FULL-TIME ENROLMENT, 1970 - 2005

	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Enrolment	12,350	14,150	16,350	18,400	20,350	22,000	23,200	24,500
Enrolment as Per cent of University Enrolment	41.0	42.1	43.8	44.4	45.6	46.4	46.3	46.6
Enrolment as Per cent of 18-24 Age Group	6.4					9.2		

	1978-79	1979-80	1980-81	1985-86	1990-91	1995-96	2000-01	2005-06
Enrolment	25,350	26,700	27,600	29,497	29,649	37,135	46,741	56,980
Enrolment as Per cent of University Enrolment	46.1	48.7	47.1	47.1	47.1	47.1	47.1	47.1
Enrolment as Per cent of 18-24 Age Group			10.1	11.1	12.1	13.4	14.6	16.2

[1] Estimates to 1980-81 from Zsigmond and Wenaas, **op. cit.**

[2] Derived.

Source: As noted in footnote 1 and calculated beyond 1980-81.

TABLE II-19

EXPECTED AND ACTUAL ENROLMENTS IN SPECIAL CLASSES FOR EXCEPTIONAL CHILDREN: CALGARY, EDMONTON, AND ALBERTA, 1969-70

	Mentally Retarded	Impaired Speech and Hearing	Impaired Vision	Emotionally Disturbed
Calgary				
Expected Number of Exceptional Students	2,089	2,757	136	2,089
Actual Enrolment	917	50	19	82
Edmonton				
Expected Number of Exceptional Students	2,264	2,988	147	2,264
Actual Enrolment	1,073	55	40	48
Other Areas				
Expected Number of Exceptional Students	4,552	6,009	296	4,552
Actual Enrolment	1,432	—	—	—
Total Province				
Expected Number of Exceptional Students	8,905	11,754	579	8,905
Actual Enrolment	3,422	105	59	130

Source: Calculated.

TABLE II-20

ENROLMENT IN SPECIAL CLASSES, ALBERTA AND EDMONTON AND CALGARY REGIONS, 1969-70

Problem	Calgary	Edmonton	Others	Total
Mildly Retarded	712	752	1,183	2,647
Severely Retarded	205	321	249	775
Speech and Hearing Impaired	50	55	—	105
Low Vision	19	40	—	59
Adoption	13	225	—	238
Emotionally Disturbed	82	48	—	130
Learning Disabilities	76	16	—	92
Institutional Services	37	344	—	381

Source: **Sixty-fourth Annual Report**, Department of Education, Government of Alberta, 1969.

TABLE II-21

DISTRIBUTION OF TAX RETURNS AND TAXABLE INCOME BY INCOME GROUP, ALBERTA, 1967

Income Class	Number of Taxable and Non-Taxable Returns	Per cent of Total Returns	Cumulative	Total Income	Per cent of Total Taxable Income	Cumulative
Under $1,000	72,914	12.4	12.4	$ 36,457,000	1.4	1.4
$ 1,000 - $ 1,999	83,625	14.1	26.5	125,437,500	4.7	6.1
$ 2,000 - $ 2,999	81,355	13.7	40.2	203,387,500	7.6	13.7
$ 3,000 - $ 3,999	77,160	13.0	53.2	270,060,000	10.1	23.8
$ 4,000 - $ 4,999	67,018	11.3	64.5	301,581,000	11.3	35.1
$ 5,000 - $ 6,999	104,507	17.7	82.2	613,450,000	22.9	58.0
$ 7,000 - $ 9,999	67,761	11.4	93.6	555,632,000	20.8	78.8
$10,000 - $19,999	32,415	5.5	99.1	437,602,500	16.4	95.2
Over $20,000	5,270	0.9	100.0	129,492,500	4.8	100.0
Total	592,025	100.0		$2,673,100,000	100.0	

Source: Calculated from Alberta Bureau of Statistics, **op. cit.**

CHAPTER THREE

PROSPECTS FOR GROWTH IN THE PROVINCIAL ECONOMY

Product and Income Characteristics

Canadian Gross National Product

As a preface to a more detailed analysis of economic growth trends and problems in Alberta, this introductory section briefly examines national indicators of economic performance. Growth in Canadian Gross National Product during the period 1950-1965 is shown in Table III-1 at five-year intervals. Data are provided by the Dominion Bureau of Statistics and refer to total Gross National Product (GNP), as well as to GNP per capita, both in current and constant dollar values, with 1957 as the base year.

Total GNP in current dollars increased by almost three times in the 15 years between 1950 and 1965. Part of this rapid increase, from about $18 billion in 1950 to more than $52 billion in 1965, reflects the increases in the general price level. Discounting price movements, the GNP figures for the years 1950 and 1965 are $23.4 and $44.7 billion, respectively, in 1957 dollars. In other words, the total GNP in constant (1957) dollar values was, in 1965, slightly less than twice as large as in 1950.

The GNP level has been projected through the year 2005 on the basis of an assumed 5 per cent annual rate of real growth. The 5 per cent is an arbitrary compromise between the Economic Council's 5.25 - 5.5 per cent potential growth estimate and historical growth of about 4.6 per cent in recent years.[1] Prices are projected to rise at a rate of 2.5 percentage points per year beyond 1970. Total GNP in current dollars is projected to increase from $84 billion in 1970 to $162 billion in 1980 to $758 billion in 2005. GNP in constant (1957) dollar values is projected to rise from $60 billion to $98 billion in 1980 to $334 billion at the end of the 35-year period.

GNP per capita experienced a substantial increase between 1950 and 1965, both in current and constant dollar values. Per capita GNP in current dollar values grew from $1,314 to $2,658 during the 15-year period. The respective figures in constant dollar values were $1,708 and $2,279.

Per capita GNP in current dollar values will increase from $3,967 to $6,462 between 1970 and 1980, given a 5 per cent real growth rate. In constant dollar values, per capita GNP is expected to rise from $2,848 in 1970 to $3,933 in 1980.[1] No population estimates for Canada for 2005 are used here and therefore no attempt is made to quantify GNP per capita beyond 1980.

Canadian Personal Income

Total personal income in current dollar values increased from $13.4 billion in 1950 to $38 billion in 1965. Projected at a 5 per cent real growth rate, with a price inflator of 2.5 percentage points per year, personal income will rise from $66 billion in 1970 to $127 billion in 1980 and to $593 billion in 2005. Allowing for price changes, total personal income in constant (1957) dollar values varied from $17.4 billion in 1950 to $32.6 billion in 1965. Constant price projections for 1970, 1980, and 2005 are $47 billion, $77 billion, and $261 billion, respectively (see Table III-2).

Personal income per capita grew from $978 in 1950 to $1,935 in 1965. From 1970 to 1980 it is expected to increase from $3,103 to $5,057. In constant dollar values, personal income per capita increased from $1,272 in 1950 to $1,659 in 1965. Expected levels for 1970 and 1980 are $2,229 and $3,078, respectively in 1957 dollars.

Alberta Gross Provincial Product[2]

Gross Provincial Product for Alberta for the period 1950-1965 was calculated on the basis of

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[1] Economic Council of Canada, Sixth Annual Report, **Perspective 1975, 1969.**

[1] Population estimates for the period 1970-1980 are from **W. M. Illing, et. al., Population, Family, Household, and Labour Force Growth to 1980,** Economic Council of Canada, 1967, Staff Study No. 19.

[2] Gross Provincial Product (GPP) may be defined as the value of all final goods and services produced in the province, ordinarily measured as a flow of activity over the course of a year.

Alberta Personal Income data. The relationship between the two measures of economic activity was estimated by the Alberta Bureau of Statistics for the years 1962 through 1967 and is assumed to remain constant for the period covered by the time series and projections.

Gross Provincial Product (GPP) in current dollar values is estimated to have increased from $1.2 to $3.8 billion between 1950 and 1965. On the basis of a 5 per cent real growth rate and a 2.5 percentage point inflation factor, it is expected that GPP will rise from about $6.2 billion in 1970 to $11.9 billion in 1980 and to $56.1 billion in 2005 (see Table III-3).

Alternative estimates of GPP for the period 1970 to 2005 are based on the assumption that the annual provincial rate of real growth after the year 1970 will be 5.5 per cent, as shown in Table III-4. The 5.5 per cent more nearly approaches the rate of real growth of the province in the last 20 years. This alternative set of estimates is used here for illustrative purposes only and will not be carried forward in subsequent analysis.

On the basis of the 5.5 per cent assumption, total GPP at current dollar values will grow from about $6.2 billion in 1970 to $12.5 billion in 1980 and to $66.2 billion in 2005.

Gross Provincial Product in constant (1957) dollar values projected at 5.5 per cent in real terms will grow from about $4.5 billion in 1970 to $7.8 billion in 1980 and $29.6 billion in 2005.[1]

Gross Provincial Product Per Capita

Gross Provincial Product per capita increased from $1,355 in 1950 to $2,649 in 1965 (current dollars). Projecting GPP at a 5 per cent growth rate results in GPP per capita growth from $3,901 in 1970 to $6,097 in 1980, and $18,498 in 2005 current dollars (see Table III-3).

If GPP is projected at the 5.5 per cent real growth rate, the figures for 1970, 1980, and 2005 are $3,901, $6,392, and $21,838, respectively, again in current dollars (see Table III-4).

In constant dollar values, GPP per capita increased from $1,766 in 1950 to $2,272 in 1965. With an assumed 5 per cent annual rate of real growth, the levels for 1970, 1980, and 2005 become $2,858, $3,775, and $8,258, respectively. On the basis of the alternative 5.5 per cent annual rate of real growth, the relevant figures for 1970, 1980, and 2005 are $2,858, $3,958, and $9,749, respectively, in constant (1957) dollars.

Alberta Personal Income

Total Provincial Personal Income in current dollar values increased from $930 million in 1950 to $2.9 billion in 1965, or more than three times. For the period 1970-2005 it can be expected to rise from about $4.6 billion in 1970 to nearly $9 billion in 1980 and $42.1 billion by 2005, assuming that an annual real growth rate of 5 per cent is sustained (see Table III-5).

In constant (1957) dollars, total personal income increased from $1.2 billion in 1950 to $2.5 billion in 1965. With an annual rate of real growth of 5 per cent, total personal income will grow from about $3.4 billion in 1970 to $5.5 billion in 1980 to $18.8 billion in 2005 (see Table III-5). If the provincial real growth rate is 5.5 per cent, the personal income figures are $3.4 billion in 1970, $5.8 billion in 1980, and $22.2 billion in 2005 (see Table III-6).

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[1] The recent slowdown in economic activity in Alberta has been discounted entirely in the 1970 data. In other words, gross product and personal income levels for 1970 were held at the 1969 levels except for estimated price increases. Thus, for projection purposes, the economic slowdown that has continued on into 1971 was accounted for entirely by holding real growth to zero during 1970 and projecting growth at 5 per cent beyond 1970. This introduces a conservative bias into the provincial projections that was not necessary for the Canadian projections since some preliminary 1970 data for Canada were available at the time the projections were revised. This difference in method also explains at least some of the disparity between Alberta and Canada in gross product and personal income data in per capita terms. Thus, provincial projections may be considered conservative for three reasons: (1) the arbitrariness of the assumption that the recent recession in economic activity resulted in a zero rate of real growth in 1970; (2) the 5 per cent real growth rate projection, a lower rate than that actually experienced in real terms in the province within the last two decades; and (3) the fact that the Canadian gross product and personal income series are based on an actual price level through 1970, so that the price index for 1970 is about 139, as calculated by the Dominion Bureau of Statistics in March, 1971. The 2.5 percentage point inflator is assumed for Canadian data beyond 1970. For Alberta, on the other hand, many calculations had to be made and projected early in the study, so that it was not possible to wait until preliminary data on price changes during 1970 had been made available. Thus, the Alberta data are based on an assumed price change in 1970 equal to 2.5 percentage points rather than the 5 percentage points that actually occurred, but not reported until March, 1971. While this makes the two projections of gross product and personal income not strictly comparable, the Canadian data are merely introductory in any event and will not be used in subsequent analyses.

Personal Income Per Capita

The province's personal income per capita measured in current dollar values almost doubled between 1950 and 1965, from $1,019 to $1,992. Under the assumption of a 5 per cent real growth rate per year, per capita personal income will increase from $2,927 to $4,573 to $13,873 between 1970, 1980, and 2005 (see Table III-5). If the real growth is 5.5 per cent per year, personal income per capita can be expected to change from $2,927 in 1970 to $4,794 in 1980 to $16,379 in 2005, again in current dollars (see Table III-6).

Measured in constant (1957) dollar values, personal income per capita increased from $1,325 in 1950 to $1,708 in 1965. Projections, based on a 5 per cent growth rate after 1970, indicate that personal income per capita will increase from $2,144 in 1970 to $2,832 in 1980 and $6,194 in 2005. Assuming a rate of growth of 5.5 per cent per year, the respective figures become $2,144, $2,969, and $7,312, in constant dollars.

Industrial Characteristics

Primary and Secondary Industries in Alberta

Table III-7 presents a summary of the net value of production of primary and secondary industrial sectors in the Province of Alberta for selected years between 1935 and 1969. Data and definitions of the sectors are provided by the Alberta Bureau of Statistics.[1]

Net value of production of primary and secondary industries was $147 million in current prices in 1935. Steady growth pushed the value to $750 million by 1950, $1.5 billion by 1960, and about $3.2 billion in 1969.

After 1940, the economy of Alberta underwent comprehensive changes which affected the structure of industry and the relative importance of the various industrial activities. Undoubtedly, the most significant changes were the decline in relative importance of the agricultural sector and the equally dramatic rise of the mining sector.

Since 1940, the agricultural sector has experienced an almost continuous decline in relative importance. In 1935, net value of production of that sector accounted for about 54 per cent of total net value of production of all primary and secondary sectors in the province, and five years later its share had increased to 58.5 per cent. Since 1940, its share has dropped to 44 per cent in 1950, 21.4 per cent in 1960, and 19.2 per cent in 1969.

The farm sector enjoyed a temporary improvement in relative position in the mid-1960's, when its share of provincial primary and secondary output increased to 22.9 per cent in 1965 and 25.2 per cent in 1966. Moreover, in absolute terms, net value of agricultural production showed a substantial increase from $79 million in 1935 to $620 million in 1969, having recorded a high point of $655 million in 1966. In 1969, agriculture contested both manufacturing and construction as the second largest basic industry in the province.

Due largely to the growth of natural gas and petroleum production, the mining sector increased its share of total net value of primary and secondary industrial production from 10.9 per cent in 1935 to 16.3 per cent in 1950, 22.7 per cent in 1960, and 33.9 per cent in 1969. Absolute net value of mining production showed a rapid and steady increase from $16 million in 1935 to $123 million in 1950, $349 million in 1960, and $1.1 billion in 1969.

The forestry, fisheries, and trapping share of primary and secondary output fluctuated between 1.3 and 2.3 per cent through the 1950's. After 1960 the relative (and in some instances, absolute) importance of the sector decreased substantially. Net value of output increased from $2.5 million in 1935 to $24 million in 1960, and then decreased to $11 million in 1969.

The net value of electric power produced in Alberta shows a steady increase, in absolute terms, and long-term stability in relative terms. This value rose from $4.6 million in 1935 to only $14 million in 1950, then accelerated sharply to $49 million in 1960 and $100 million in 1969. The relative share of the sector was 3.1 per cent of the net value of primary and secondary production at the beginning and the end of the 35-year period.

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[1] Alberta Bureau of Statistics, **Alberta Industry and Resources,** 1970 Edition, Department of Industry and Tourism, Government of Alberta.

Somewhat surprisingly, the relative share of the manufacturing sector also shows considerable stability. Starting with a 16.1 percentage share in 1935 it reached a low of 14.9 per cent in 1940, a high of 22.1 per cent in 1960, and then dropped to 19.9 per cent in 1969. The monetary value of manufacturing activity increased steadily from $24 million in 1935 to $124 million in 1950, and then, in step with the accelerating provincial growth rate, increased to $339 million in 1960 and $640 million in 1969.

Construction showed a steady upward trend in absolute terms and, predictably, a variable share of primary and secondary output between 1935 and 1969. The net value of production was $21 million in 1935, $148 million in 1950, $446 million in 1960, and $760 million in 1969. Its share of the output of all primary and secondary industries fell from 14.3 per cent in 1935 to 11.5 per cent in 1940, but rose for the next 20 years to an all-time high of 29 per cent in 1960. After 1960, the relative share varied from a low of 21.1 per cent in 1965 to a high of 23.7 per cent in 1967 (see Appendix A).

Technology, Growth, and the Provincial Resource Base

The relationship between economic growth and technology requires continuing attention in the analysis of the growth process. Projecting Albertan and Canadian economic growth at a 5 per cent rate involves implicit assumptions about the continued ability of the provincial and national economies to channel changes in the industrial arts, including information systems, into the productive process.

Studies of economic growth in Canada attempt to identify and quantify the impact of various elements in the ability of the country to increase the size of economic output.[1] These studies, similar to studies of growth in the United States, emphasize variables such as size and nature of the resource base, including human capital; size and age of a community's capital stock; relationship between actual and potential employment levels; labor and capital input ratios; and, invariably, a residual variable that relates changes in the application of technology over time to productive economic activity.

Simultaneously with the development of economic models of national growth and development, there has occurred an interest in formulating economic models of regional growth within a national setting. One of the important developments in economic analysis in recent years has been this emergence of regional science as an academic and professional field. The overriding purpose of regional economics is to formulate a theory capable of explaining growth and development of regions and to predict the impact of changes in specific variables on these processes. As has been done in analyzing national growth processes, economists have sought to develop simulation models of regional growth and development which will identify and quantify the crucial determinants of regional economic change.

The regional growth model used in the following analysis of Alberta's economy is referred to as the economic-base or export-base model. It finds the genesis of economic growth of a region in its ability to capture the comparative advantage afforded by the unique configuration of a broadly-defined resource base through the export of economic goods and services. The comparative advantage of a region may take the form of spatial characteristics, e.g., proximity to markets; labor force characteristics, e.g., a concentrated pool of highly-trained scientific manpower; or other variables such as the unique availability of industrial raw materials. It will be noted, then, that this export-base theory of regional growth draws on the theory of comparative advantage much as economic analysis has used the concept to explain the flow of commerce among nations.

A region grows by virtue of its ability to develop a set of basic export industries capable of utilizing the peculiar characteristics of its resource base, including technological know-how. As these exports give rise to flows of income into the region, there will develop a related set of activities that complement basic sectors, such as manufacturing industries in Alberta based on petroleum and natural gas exploration and development. In fact, these industrial sectors based on exports of processed goods themselves become sources of basic income for the region. Attendant to these tiers of economic activity is a third tier comprised of those sectors, such as trade and services, which complete the set of economic activities in the sense that they provide a community with amenities of life by filling the void of consumer goods and services.

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[1] Cf., Lithwich and Wilson, Study Number 24, **The Sources of Economic Growth,** the Royal Tax Commission, Queen's Printer, 1966 and annual reports of the Economic Council of Canada.

While this is admittedly an over-simplified picture of how a region grows, it identifies the basic elements of economic progress in the sense that it suggests a causal sequence of income and product growth. At some stage in the growth process, a region will begin to enjoy scale economies in various sectors that allow it to generate an internal growth force based upon the set of demands generated by basic industries. This will happen, for example, in manufacturing and professional services, as local sectors expand to replace a previous reliance on specific imports.

Alberta's basic comparative advantage in inter-regional and international competition derives from the unique character of its resource base. In recent years this resource base has found economic growth potential in continued agricultural exports. A more spectacular growth potential, however, was ushered in by the successful exploration for petroleum and natural gas and this has become the basic growth cone of the provincial economy. Supplementary to this mineral activity has been the development of petroleum-based and natural gas-based manufacturing activities. Simultaneously, the variety and beauty of the province's scenic assets provide a broad base for continued development of a tourist trade, which acts as an export base when tourists outside the province visit Alberta and when Alberta's own population substitutes local for outside recreational activities. In the latter case, an import-replacing activity has occurred. Import-replacing activities also occur in other sectors.

The Petroleum Resource Base

Because of the importance of petroleum to Alberta's economic growth, and because petroleum, unlike water, is a stock rather than a flow resource and thus subject to exhaustion, it is important to inquire into the continued availability of petroleum for export during the forecast period.

Table III-8 provides data on petroleum supply conditions in relation to the growing level of initial proved reserves of recoverable crude oil in Alberta from 1948 through 1969, as compiled by the Alberta Oil and Gas Conservation Board. The table demonstrates that despite an increase in annual production from 10.5 million barrels in 1948 to 279.2 million barrels in 1969, the remaining reserves of crude oil in the province increased in every year of the period. At the end of 1969, initial proved reserves in the province totalled 10,683 million barrels. The Board estimates that normal appreciation factors should increase these 10,683 barrels to 14,800 barrels "by the time all such pools are fully developed and enhanced recovery operations implemented where appropriate."[1]

Deducting cumulative production through 1969 from the initial proved reserve figure of 10,683 million barrels yields remaining reserves of 7,695 million barrels at the end of 1969.

In a 1968 study,[2] the Board prepared an analysis of Alberta's conventional oil life index. Basic determinants of the life index for conventional crude oil, of course, are supply and demand conditions. The Board constructed alternative supply forecasts for initial conventional crude oil reserves as follows (in millions of barrels):

YEAR	LOW	MEDIUM	HIGH
1967	9,400	9,400	9,400
1970	10,850	11,100	11,450
1975	13,000	13,750	14,650
1980	14,400	15,700	17,200

These forecasts relate to initial conventional crude oil reserves, not including an appreciation factor.

Simultaneously, the Board forecast demand for Alberta oil at 896,000 barrels per day in 1970, 1,188,000 barrels per day in 1975, and 1,594,000 barrels per day in 1980. The corresponding demand for conventional, crude oil (not including synthetic crude) was estimated to be 728,000 barrels per day in 1970, 989,000 barrels per day in 1975, and 1,389,000 barrels per day in 1980.

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[1] Oil and Gas Conservation Board, **Reserves of Crude Oil, Gas, and Natural Gas Liquids and Sulphur, Province of Alberta**, OGCB Report 70-18, 1969, p. V-8.

[2] **Report of an Application of Atlantic Richfield Company, Cities Service Athabsaca, Inc., Imperial Oil Limited and Royalite Oil Company, Limited Under Part IV A of the Oil and Gas Conservation Act, OGCB Report 68-C, 1968.**

On the basis of these basic inputs, the Board then built its life index model for Alberta's conventional crude oil. Using the medium supply projection and the above demand projection, the Board estimates the life index to be 31 years in 1970, 26 years in 1975, and 18 years in 1980. Under alternative assumptions of the low supply forecast and a 25 per cent increment in demand, the corresponding figures were 24, 18, and 11 years.

Using the Board's medium forecast with regard to supply and growing demand as indicated, Alberta's life index of conventional crude oil in 1980 would carry through the year 1998. The Board calls attention to the fact that the shortest life index results from a set of assumptions that is quite unrealistic. It should also be carefully noted that the Board's life index for conventional crude oil is based upon a substantial increase in demand for Alberta crude oil and thus anticipates a continued increase in the level of exports from the province during the period to which the life index applies.

Finally, in 1969, the Board again suggested that the probable ultimate initial recoverable reserves of conventional crude oil in Alberta will be in the magnitude of 20 billion barrels.[1] This represents an increase of about 30 per cent from the supply level included in the medium forecast for 1980. This probable increment in initial reserves, plus the expected appreciation factor, suggests that the life index of conventional crude oil in Alberta might very well extend beyond the year 2005. All this, of course, does not take into account potential supplies of synthetic oil from tar sands.

The Natural Gas Resource Base

Table III-9 from the Oil and Gas Conservation Board shows the initial and remaining established reserves of marketable gas in Alberta at the end of 1969. From 1948, when initial reserves of natural gas totalled nearly 4 trillion cubic feet, initial reserves grew to nearly 55 trillion cubic feet in 1969. Annual production during the same period grew from 38 billion cubic feet to 1.3 trillion cubic feet. Simultaneously, cumulative production increased from 541 billion to 9.7 trillion cubic feet. Thus, at the end of 1969 there were remaining established reserves of 45.1 trillion cubic feet of natural gas in Alberta.

An unsophisticated life index for natural gas in the province may be approximated from the Oil and Gas Conservation Board estimate that the ultimate recoverable reserves of natural gas in Alberta will probably approximate 100 trillion cubic feet. This is based upon a long term growth rate of 2.5 trillion cubic feet per year on a declining basis to a total of some 25,000 exploratory wells; and upon the Board's Geology Department's "estimates based upon the volume of favourable sediments and average accumulation factors."[1]

This estimate of ultimate recoverable natural gas of 100 trillion cubic feet represents an increment of about 45 trillion cubic feet over the initial marketable gas at the end of 1969. If annual production of natural gas were to increase from 1.3 trillion cubic feet to an annual average of 2 trillion cubic feet, an increase of about 50 per cent from present levels, the 90 trillion cubic feet of estimated remaining reserves indicates a life index of natural gas beyond the forecast period. This estimate, of course, is based on a much less sophisticated life index model than that used by the Board in constructing the conventional crude oil life index. It is suggested here as only a crude guide to an important indicator of provincial economic growth potential.

Coal and Technology

The previous discussion of available supplies of conventional crude oil and natural gas was based on the implicit assumption that the industry will be free to continue to apply the latest technological break-throughs via continued private investment to the problems of exploration and recovery. Implications of this assumption for capital movements from the United States, and the resultant questions of foreign ownership will be discussed at a later point in this chapter.

Moving on to the prospects of coal as a growth force in the provincial economy provides an opportunity to consider the variable impact of changing technology on industrial and resource activity. From the prior day use of coal as the province's major source of energy, the coal industry fell precipitously during the 1950's. The industry's market was pre-empted by a technology which created alternative forms of energy for railroad locomotion—diesel fuel—and alternative forms of space heating—natural gas.

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[1] Oil and Gas Conservation Board Report 70-18, **op. cit.**, p. V-9.

[1] Oil and Gas Conservation Board Report 70-18, **op. cit.**, p. V-16.

If technology was the basic ingredient of decline in the 1950's, so too is it the basic ingredient of growth in the future. On the market side, coal has begun to reassert itself as an energy source in thermal plants for generation of electricity in the province. Given the massive supplies of coal technologically appropriate for thermal plants, there is no clear reason to question continued development of coal resources for this domestic activity. Simultaneously, there has developed a steadily increasing demand for Alberta coal for industrial use in Japan. Already, contracts for 65 million tons of coal for export to Japan have been signed and increased exports beyond this level appear certain.

Extended markets for coal will be determined by how efficiently the industry can apply technology to fertilizers, activated carbons, liquid fuels, etc. Technological change as it affects the growth potential of coal has two other facets besides additional uses. They relate to the technology of extraction and the technology of transportation. With regard to extraction, strip mining has become the most efficient method of recovery and has involved an extensive capital-for-labor substitution. One of the remaining problems of strip mining, for which there is some evidence of technological advance, is the requirement that it be conducted in such a way that ecological deterioration is minimized through a continuing process of returning the landscape very near to its original condition.

With regard to making coal a competitive source of energy and a competitive source of chemical supply, the technology of transportation has become a crucial factor. The Alberta Resources Railway was constructed between 1965 and 1967 to provide access to the Japanese market for coking coal from the deposits at Grande Cache. Similarly, the development of automated unit trains establishes the possibility of further use of Alberta coals in Canada, while the development of super-tankers and deepwater ports at Vancouver gives access to overseas markets. Further experimentation in transportation systems involves such devices as movement by pipeline and/or conveyor belts.

Mineable reserves of coal are defined in terms of bituminous coal seams three feet or more in thickness, and covered by less than 1,000 feet of over-burden. Recoverable reserves have been defined arbitrarily as about 50 per cent of mineable reserves. In Alberta, according to the Alberta Bureau of Statistics, mineable reserves are in the neighborhood of 48 billion tons, about half of Canada's total! Thus, recoverable reserves approximate 24 billion tons.

As market, extraction, and transportation technology is applied to coal resources, there is good reason to believe that coal will continue to grow in importance as a source of export activity. Market potential, however, may well be limited to Canada and countries abroad since the United States, with its own massive reserves of coal, cannot be considered a significant market possibility. By the same token, coal is not expected to match oil, natural gas, and agriculture as a source of basic income in Alberta in the near future.[1]

Renewable Resources

Discussion of specific elements of the provincial resource base has centered thus far on resources of a stock rather than a flow nature. Crude oil, for example, is available in some aggregate amount in the province, and that amount is capable of being exhausted through consumptive use. The same thing is true for natural gas and coal, although technology will have an important impact on how far the available stock is recovered and utilized.

Another set of resources with economic growth potential is of a flow rather than a stock nature. Water is the prime example. Economic use of a resource such as water does not imply that the resource need be exhausted in terms of physical supply. Even though during one time period there may be consumptive uses of water resources (e.g., agriculture) as well as non-consumptive uses (e.g., recreation) this consumptive use does not mean exhaustion of the resource, because the source of supply is renewable. The same thing is true of forest resources for timber production, land resources for agricultural output, and all natural resources for tourist use of a non-consumptive nature.

With regard to electrical energy generation, for example, a primary characteristic of the activity is the fact that it can draw upon exhaustible resources

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[1] Alberta Bureau of Statistics, **Alberta Industry and Resources, 1970 Edition.**

(e.g., coal,) or non-exhaustible resources (e.g., water) as a source of continuing supply. The choice will vary over time, according to changes in technology and supply conditions. Technology will be a primary determinant of supply conditions, in the sense, for example, that solar energy may become a competitive source of supply to coal resources.

In Alberta, the land base coupled with water transfers to the land base suggest a continued role for the output of agricultural products. Technology, in this instance, will play an important role in devising systems of water transfer from provincial regions of water surplus to provincial regions of water shortage. Simultaneously, technology of recovery of ground water acquifers by pumping systems will in some cases determine the viability of bringing new areas into agricultural producation. In this case, water supply constraints may be finite or renewable, depending on whether acquifers are recharged from surface flows.

With regard to the forestry resource and the resource base available for tourist activities, suffice it to say that it is possible under given conditions of technology to manage these resource bases in a way that guarantees their continuous renewal. The accomplishment of this objective of continuing supply will require an advanced system of land use and program planning based, probably, on governmental use of planning-programming-budgeting systems.

Of equal interest is the question of the use of the provincial water resources. Ordinarily, water is thought of as an input to other economic processes rather than as a final output in itself. Thus, water is an input through irrigation, and may be used by 50-60 per cent. Alternatively, or additionally, water is an input into industrial, commercial, and residential processes, in which case the consumptive use may be as little as 10 per cent or less, depending on the quality of return flows.

In recent years pressure on water supplies in the United States has prompted American interest in the possible importing of Canadian water resources. Accordingly, water authorities in the United States have asked if supply and use conditions in Canada and Alberta are permissive of export of water to the United States.

From the Canadian or Albertan point of view, approached from an economic frame of reference, a question is posed: are there conditions under which it would be to our advantage to export water to the United States? As much controversy has risen over this question, which involves renewable flow resource, as has developed from the export of crude oil and natural gas, both of which are stock, nonrenewable resources.

Although it is only feasible to brush the surface of the economics of water transfer to the United States, certain basic conditions can be identified as necessary before water export can be seriously contemplated. First, an inventory of water resources, including the hydrologic phenomena associated with return flow of used water, is required. Second, it is necessary to estimate water demand in Alberta and the various conditions of consumptive use. And third, at a minimum, it is necessary to consider the technology of water transfer systems, including their impact on environment. Discussion of water exports would have to take place in the context of treating water as a marketable commodity rather than as a free commodity, as has traditionally been the case. Simultaneously, the export of water could only be contemplated on a long-term basis with provision for re-negotiation of prices during the contract period. Technology of alternative water sources, e.g., desalinization, may, of course, make the entire question of water exports academic at any point in time.[1]

Technology, Growth, Capital Flows, and Foreign Ownership

The economy of Alberta has been vitally affected by capital flows from the United States. Following major oil discoveries of 1947, massive expenditure for exploration and development investment poured into the province, and consistently a large part of it came from the United States. From the point of view of Albertan economic growth, two major benefits may be observed as a result of this investment activity. First, one of the world's most advanced petroleum technologies was brought to bear on the process of exploration, development, and recovery of crude oil and natural gas. The fact that Alberta was already advanced culturally, socially, and economically meant that the new technology could be absorbed without serious dislocation into the institutional structure. This minimal dislocation would not necessarily have been the case with an underdeveloped country.

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[1] For a discussion of the economics of water transfers see L. M. Hartman and D. A. Seastone, **Water Transfers: Economic Efficiency and Alternative Institutions,** published by Johns Hopkins University Press for Resources for the Future, Baltimore, Md., 1970.

Secondly, the process of economic growth in Alberta was probably accelerated by the fact that investment was financed not out of the current Alberta Gross Provincial Product, but from abroad. In other words, domestic savings were not a critical constraint on investment in the province.

Offsetting these economic growth benefits was an increasing foreign ownership of Alberta firms and/or resources. From an income point of view, this meant that part of the income generated by petroleum activity was exported out of the province in the form of dividends to U.S. firms and citizens. This, in turn, grew out of the fact that venture capital in the petroleum industry most often takes the form of equity rather than debt capital.

From a decision-making point of view, U.S. ownership meant that important decisions about resource use and other policy matters were being made by persons not directly responsible to the Canadian citizenry.[1]

Thus, there has emerged an interest in recapturing Canadian operating control of firms doing business in Canada. This policy matter is considered at this point to differentiate clearly between the question of foreign ownership of firms doing business in Canada and having access to Canadian resources, and the question of the sale of Alberta products to foreign buyers.

The economic growth model analyzed briefly in this chapter suggests that Alberta economic growth is crucially dependent on the continued sale of mineral outputs abroad; abroad in this instance means any place outside Alberta, but for all practical purposes it means the Eastern provinces, the United States, and possibly the Far East. Continued economic growth is vitally dependent upon continued growth in these markets, after domestic needs have been satisfied.[2]

This, however, is a separate question from the issue of foreign ownership. The economic benefits and costs of foreign ownership—e.g., advanced technology, the use of foreign capital for domestic investment, repression of a domestic entrepreneurial class—can be analyzed separately from the question of export sales. It is clearly possible that the cultural, social, and political disadvantages of foreign ownership as Canadians view them may eventually outweigh economic benefits. If this calculus requires domestic ownership, there could well be a significant impact on economic growth. This impact, however, and the problems to be sorted out in making the decision, are different from and require separate analysis from the question of foreign markets for domestic output.

The Alberta Labor Force: Level and Composition

In formulating educational programs to meet community educational objectives, one of the goals that will guide a program design and evaluation is the education of students for some labor role in society. This is not to suggest that preparing students for some economic activity after graduation is the single or the most important objective of education. It will necessarily be, however, one of the primary considerations in program design.

Whether education should be designed to prepare students for specific jobs or to develop critical skills useful in a variety of ways is an issue which need not be discussed here, except by implication. Of interest at this point are the current dimensions of Alberta's labor force, its occupational composition, and what might become the size and composition of the labor force during the forecast period.

The provincial labor force grew from 353,497 in 1951 to 489,511 in 1961 (see Table III-10). The Alberta Bureau of Statistics estimates that the labor force reached a level of 628,000 in 1969. According to this estimate, the labor force participation rate as a percentage of total provincial population increased from 37 per cent in 1961 to 40 per cent in 1969. Table III-10 also provides a picture of employment by economic and industrial sector in 1951 and 1961. These data are updated in Table III-11, which plots change in employment in selected industries. Table III-11 does not include estimates of employment in agriculture and fishing and trapping, nor does it include an unspecified or undefined classification. The industries plotted between 1961 and 1969 constitute an increasing percentage of the total labor force, having grown from about 62 per cent in 1961 to about 73 per cent in 1969. Most of the difference is undoubtedly explained by the decline in employment in agriculture as a percentage of the labor force. The data in Table III-10 indicate that agricultural employment declined absolutely as well as relatively from 1951 to 1961. In all probability this absolute decline extended to 1969, but at a decreasing rate, and employment in agriculture in 1969 and today is probably less than 100,000.

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[1] For a detailed discussion of the alleged costs of foreign capital movements into Canada, cf. Karl Levitt, **Silent Surrender**, MacMillan of Canada, Toronto, 1970.

[2] In this regard, for example, it is estimated by the Alberta Oil and Gas Conservation Board that provincial use of natural gas in the rest of this century will require about 16 trillion cubic feet of natural gas, while the Board's estimates of remaining recoverable reserves are about 90 trillion cubic feet.

Although no attempt will be made to project employment by industry into the future, there is no **a priori** reason to believe that trends noted in Table III-11 will be reversed. For example, the substantial shift of employment in absolute and relative terms to the community, business, and personal services sector is probably a continuing phenomenon, occuring also in manufacturing, trade, etc. One of the significant features of the data in Table III-11 is the relative stability in employment in public administration and defence, which remained constant at 5.2 per cent of the labor force between 1961 and 1969.

Table III-12 provides the frame of reference for labor force projections to be developed in this chapter, measuring labor force composition by occupational group rather than industrial sector. The rates of change in occupational groupings between 1951 and 1961 are noted in Table III-12, the highest rates of increase occuring in professional and technical occupations—6.9 per cent per year.

The most recent major study projecting labor force characteristics in Canada by occupational groups is used as the basis for estimating possible occupational requirements in Alberta in the future. The study was conducted by B. Ahamad for the Department of Manpower and Immigration in 1969.[1] Although disaggregated only for the Prairie Provinces, it has been applied to Alberta on the assumption that the size of occupational groups for the Prairie Provinces can be assigned to specific provinces on the basis of population. The study projects occupations to 1975 and is shown in Table III-13 for Alberta as method A. Method B was used for comparative purposes and derived occupational groups by extrapolating the rate of increase in occupations from 1951 to 1961 forward to 1975. Results of the two methods were similar in most cases, some dissimilarity appearing in the clerical, sales and service, and recreation occupations.

The Ahamad data for the Prairie Provinces as applied to Alberta were rounded off to the lowest percentage and carried forward to 1980 on that basis (see Table III-14). It should be clearly understood that the system used to project employment in Alberta to 1980 by occupational group is based essentially on the methods used in the Ahamad study. Percentage allocations of the labor force to occupational groups are virtually the same for Alberta in 1980 as those projected by Ahamad for the Prairie Provinces in 1975.

The first two rows in Table III-14 require further explanation. They relate to the assumed size of the labor force throughout the forecast period. The size of the labor force is a function of the population and the propensity of the population to seek employment. Population data are derived from Chapter I and labor force data derived and projected from historical trends and other data. For 1961, the labor force participation rate was 36.8 per cent. Participation rates for 1975 and 1980 are taken from the Economic Council of Canada study.[2] The Council estimates that the labor force participation rate for Canada will be 41.3 per cent by 1975 and 42.6 per cent by 1980. Based on the 40 per cent participation rate in Alberta in 1969, and its significant growth since 1961, these estimates may turn out to be conservative for this province (see Table III-15).

Beyond 1980, it is assumed that the labor force participation rate will continue to increase, reaching a level of 48 per cent in 2005. In many advanced industrialized countries, the labor force participation rate has grown to a level well beyond that of Canada. Table III-16, for example, shows that the participation rate in Great Britain and Germany was already near 48 per cent as far back as 1962.

The labor force propensity in Alberta should continue to grow, despite longer schooling and earlier retirement, because of the significant increase that can be expected in the number of women in the labor force. Table III-17 shows the participation rate of women in six other countries, and only in Italy is the participation rate of females in the labor force nearly as low as the 27.2 per cent in Canada in 1962. Moreover, as shown in Tables III-18 and III-19, the increase in labor force participation rate in Alberta between 1951 and 1961 resulted from the increase in female participation rate during that decade, in a magnitude more than sufficient to offset the decline in the labor force participation rate of males.

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[1] B. Ahamad, **A Projection of Manpower Requirements by Occupation in 1975.** Department of Manpower and Immigration, Canada, 1969.

[2] Illing, et al., Economic Council of Canada, Staff Study No. 19, **op. cit.**

Beyond 1980, the changes projected in the percentage allocations of the labor force to particular occupational groups are minimal and arbitrary. The most significant changes are the increase from 16 to 19 per cent in professional and technical employment — based on the assumption that an increasingly complex technology will require such changes—and the continued decline in agricultural employment as a percentage of total employment, based on the assumption of continued capital for labor substitution in that sector. Obviously, because of the extremely precarious assumptions built into the projections, they should be approached, interpreted, and used with great caution.

Finally, on the assumption that the internal composition of professional and technical employment will remain constant during the forecast period, the category is disaggregated and projected to 2005 in Table III-20. The six disaggregated categories, to repeat, are expected to remain constant with regard to their percentage share of total professional and technical employment. Categories used in Table III-20 are (1) Professional Engineers; (2) Biologists and Agriculture Professionals; (3) Teachers; (4) Health Professionals; (5) Law Professionals; (6) Other Professional and Technical Groups. Major sets of occupational groups are divided into selected sub-sets of more specialized occupations. Not all the sub-sets of a major set are necessarily shown in Table III-20.

No further caveat should be necessary to the reader in interpreting the data in Table III-20. Projection is based on a set of assumptions that should be well understood before the data are used as a frame of reference for policy discussions.

If the projections in Table III-20 are interpreted as providing some direction for educational planning, the pressing needs of education will include the training of teachers and health professionals. The table should be looked on as a first approximation to educational requirements, useful for initial analysis but requiring much more specific analytic methods as a prerequisite to implementation into education planning processes.

In the matter of the required numbers of teachers in 1980 and 2005, for example, data in Table III-20 probably misinterpret specific teacher requirements. According to the projections in Chapter II, total enrolment in 1980 will approximate 415,000 in primary and secondary schools, 58,000 in universities, and about 27,000 in post-secondary non-university institutions. Total enrolment would thus approximate 500,000. Total enrolment in relation to projected teacher requirements of 40,000 would yield a student-teacher ratio of about 12.5-1. While that may not be unreasonable, the 11-1 ratio in primary and secondary schools and 40-1 ratio in post-secondary education derived from Table III-20 reverse traditional relationships. The difficulty results from methods used, i.e., holding the composition of professional categories constant. As a matter of fact, the composition of provincial teaching requirements changes significantly in the 1970's, as primary and secondary enrolment stabilizes and post-secondary enrolment increases.

Similarly for 2005, total enrolment will approximate 790,000-800,000 full-time students at all educational levels. This enrolment total, in relation to the 83,000 teacher level projected in Table III-20, suggests a student-teacher ratio of about 9.5-1. It is doubtful that the province would accept a 9.5-1 ratio as an overall guide to the appropriate number of teachers in all systems. Again, for 2005, there is the problem in Table III-20 of over-estimating elementary and secondary teaching requirements and seriously under-estimating staff requirements for post-secondary education.

More subtle problems will also affect the confidence with which the results of Tables III-14 and III-20 are used as planning guides. The principal difficulties will relate to changes in technology that can't possibly be predicted in relation to their effect on specific occupational groups and their future size requirements.

These and other difficulties in projecting manpower requirements very far into the future gave rise to the following comment by the Commission on Post-Secondary Education in Ontario:

> "Education is also often seen as an instrument of 'manpower planning'. The argument here rests on assumption of a link between the future demands of the labor market and the products of the present educational system. Yet this linkage is also hard to verify. One difficulty with a manpower-oriented educational system is that manpower planning is notoriously unreliable. This is no fault of those responsible for such planning; rather the trouble seems to lie in the very nature of manpower planning and in the difficulty of establishing any but the most tenuous links between educational requirements and future manpower needs. Certainly the rate of change that our society experienced since World War II would seem to indicate the unpredictable character of these changes, and there is no reason to assume that we are able to predict the occupational structure of our future society with any greater degree of success. It is generally agreed by most observers that the present generation of students will face a labor market made up of a majority of occupations that are presently unknown."

Finally, the Ontario Commission has conceptual difficulties with manpower training, even assuming that some kind of accurate projection model were possible:

> "Assuming, however, that we could develop better economic and manpower planning skills — and there is definitely room for improvement here — how would these manpower needs be translated into educational requirements? Basically, the problem is how to develop our educational system in such a way as to be able to provide both the immediate application of acquired knowledge and skills and, at the same time, prepare the individual for a lifetime of changes—including occupational changes. Moreover, suppose we ever solve this problem; another would still remain: how to translate that plan into reality. Experience indicates that the students base their future plans, especially educational ones, on **current** market conditions. Much better vocational and educational counselling would, of course, improve the situation and we should do all to achieve such improvements — but it would not solve the problem.
>
> "Fundamentally, therefore, the case for closer coupling of manpower and educational requirements faces political and moral objections; an effective enforcement of such coupling would lead to stricter command-type economic planning and thus to much greater infringement of the individual's freedom of choice than most of us are willing to contemplate. In a sense, this aspect of education illuminates, as perhaps no other facet does, a basic dilemma of our present society. We desire to provide as much security for the individual as possible while, at the same time, refraining from encroaching upon his area of individual freedom and responsibility.
>
> "There are some specific areas in our educational system where this dilemma needs immediate attention. For example, should we allow an unlimited entry into some of our professional schools even though we already know that there is, or that there is about to be, a surplus of manpower in this field thereby expressing our faith both in the functioning of the market mechanism and in human rationality? Or should we impose limitatations upon admissions and thus 'save' the individual from himself and his possible mistakes?
>
> "But, assuming we do know what the term 'surplus' means (it can mean merely a professional definition in order to safeguard income for the profession as a whole), should it be the government that 'saves' the individual from his own inclinations and fulfilment? These are not trivial matters and they should be decided on as a matter of principle first before we embark — willy-nilly — upon a course that can lead to some undesirable but predictable ends. For just as often as bad means corrupt good ends, so bad ends can be achieved by perfectly good means."

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[1] Commission on Post-Secondary Education in Toronto, **Post-Secondary Education in Ontario: A Statement of Issues**, p. 6, 1970.

TABLES, CHAPTER III

TABLE III-1

CANADIAN GROSS NATIONAL PRODUCT, CURRENT AND CONSTANT (1957) DOLLARS, 1950 - 2005

	1950*	1955*	1960*	1965*	1970*	1975+
GNP, Current $'s (millions)	18,006	27,070	35,928	52,203	84,468	117,464
GNP per Capita, Current $'s	1,314	1,725	2,011	2,658	3,967	5,079
GNP, 1957 $'s (millions)	23,415	28,952	33,894	44,771	60,630	77,381
GNP per Capita, 1957 $'s	1,708	1,845	1,896	2,279	2,848	3,346

	1980+	1985+	1990+	1995+	2000+	2005+
GNP, Current $'s (millions)	162,263	222,848	304,525	414,326	561,550	758,501
GNP per Capita, Current $'s	6,462	—	—	—	—	—
GNP, 1957 $'s (millions)	98,760	126,045	160,869	205,315	262,039	334,436
GNP per Capita, 1957 $'s	3,933	—	—	—	—	—

* Actual, but preliminary for 1970. + Estimated.

Source: Dominion Bureau of Statistics for GNP data to 1970. Beyond 1970, GNP is projected to increase at a rate of 5 per cent per year in real terms. For current dollars series, a price inflator of 2.5 percentage points per year is assumed. Population data to 1980 from Illing, W.M. et. al., **Population, Family, Household, and Labor Force Growth to 1980**, Economic Council of Canada, 1967, Study No. 19.

TABLE III-2

CANADIAN PERSONAL INCOME, CURRENT AND CONSTANT (1957) DOLLARS, 1950 - 2005

	1950*	1955*	1960*	1965*	1970+	1975+
Personal Income, Current $'s (millions)	13,414	19,738	27,411	38,012	66,092	91,921
Personal Income per Capita, Current $'s	978	1,258	1,533	1,935	3,103	3,975
Personal Income, 1957 $'s (millions)	17,443	21,110	25,859	32,600	47,446	60,554
Personal Income per Capita, 1957 $'s	1,272	1,345	1,447	1,659	2,229	2,618

	1980+	1985+	1990+	1995+	2000+	2005+
Personal Income, Current $'s (millions)	126,979	174,390	238,306	324,230	439,441	593,565
Personal Income per Capita, Current $'s	5,057	—	—	—	—	—
Personal Income, 1957 $'s (millions)	77,285	98,637	125,888	160,669	205,059	261,713
Personal Income per Capita, 1957 $'s	3,078	—	—	—	—	—

* Actual + Estimated

Source: Dominion Bureau of Statistics for Personal Income data to 1969. Beyond 1970, Personal Income is projected to increase at a rate of 5 per cent per year in real term. For current dollars series, a price inflator of 2.5 percentage points per year is assumed. Population data to 1980 from Illing, W. M., et. al., **Population, Family, Household, and Labor Force Growth to 1980**, Economic Council of Canada, 1967, Study No. 19.

TABLE III-3

ALBERTA GROSS PROVINCIAL PRODUCT, CURRENT AND CONSTANT (1957) DOLLARS, 1950 - 2005, ASSUMING 5% GROWTH RATE BEYOND 1970

	1950+	1955+	1960+	1965+	1970+	1975+
GPP, Current $'s (millions)	1,237	1,913	2,773	3,841	6,194	8,630
GPP per Capita[2], Current $'s	1,355	1,753	2,148	2,649	3,901	4,901
GPP, 1957 $'s (millions)	1,612	2,046	2,616	3,294	4,538	5,792
GPP per Capita, 1957 $'s	1,766	1,875	2,027	2,272	2,858	3,289

	1980+	1985+	1990+	1995+	2000+	2005+
GPP, Current $'s (millions)	11,938	16,415	22,456	30,582	41,481	56,072
GPP per Capita[2], Current $'s	6,097	7,561	9,416	11,790	14,781	18,498
GPP, 1957 $'s (millions)	7,392	9,434	12,041	15,368	19,613	25,032
GPP per Capita, 1957 $'s	3,775	4,346	5,049	5,924	6,989	8,258

+ Estimated

[1] See footnote 1, Table III-4. The data series in this table projects economic growth in Alberta at 5 per cent, lower than the economic performance of the last 20 years but consistent with assumptions about national economic growth in Tables III-1 and III-2.

[2] Population estimates from the Alberta Oil and Gas Conservation Board; assumed annual price inflator of 2.5 percentage points per year.

Source: Alberta Bureau of Statistics, for selected historical estimates.

TABLE III-4

ALBERTA GROSS PROVINCIAL PRODUCT, CURRENT AND CONSTANT (1957) DOLLARS, 1950 - 2005, ASSUMING 5.5% GROWTH RATE BEYOND 1970

	1950+	1955+	1960+	1965+	1970+	1975+
GPP, Current $'s (millions)	1,237	1,913	2,773	3,841	6,194	8,837
GPP per Capita[2], Current $'s	1,355	1,753	2,148	2,649	3,901	5,018
GPP, 1957 $'s (millions)	1,612	2,046	2,616	3,294	4,538	5,931
GPP per Capita, 1957 $'s	1,766	1,875	2,027	2,272	2,858	3,368

	1980+	1985+	1990+	1995+	2000+	2005+
GPP, Current $'s (millions)	12,516	17,626	24,689	34,429	47,822	66,192
GPP per Capita[2], Current $'s	6,392	8,119	10,352	13,273	17,043	21,838
GPP, 1957 $'s (millions)	7,750	10,130	13,238	17,301	22,611	29,550
GPP per Capita, 1957 $'s	3,958	4,666	5,551	6,670	8,058	9,749

+ Estimated

[1] Alberta Gross Provincial Product is derived from Alberta Personal Income data. The relationship between Alberta Gross Provincial Product and Alberta Personal Income is assumed to remain constant, and is derived from gross product and personal income relationships estimated by the Alberta Bureau of Statistics for the years 1962 through 1967.

[2] Population estimates from the Alberta Oil and Gas Conservation Board; assumed annual price inflator of 2.5 percentage points per year.

Source: Alberta Bureau of Statistics, for selected historical estimates.

TABLE III-5

ALBERTA PERSONAL INCOME, CURRENT AND CONSTANT (1957) DOLLARS, 1950 - 2005, ASSUMING 5% GROWTH RATE BEYOND 1970[1]

	1950*	1955*	1960*	1965*	1970+	1975+
Personal Income, Current $'s (millions)	930	1,438	2,085	2,888	4,646	6,473
Personal Income per Capita[2], Current $'s	1,019	1,318	1,615	1,992	2,927	3,676
Personal Income, 1957 $'s (millions)	1,209	1,538	1,967	2,477	3,404	4,344
Personal Income per Capita, 1957 $'s	1,325	1,410	1,524	1,708	2,144	2,467
	1980+	1985+	1990+	1995+	2000+	2005+
Personal Income, Current $'s (millions)	8,954	12,312	16,843	22,937	31,112	42,054
Personal Income per Capita, Current $'s	4,573	5,671	7,063	8,842	11,086	13,873
Personal Income, 1957 $'s (millions)	5,544	7,077	9,032	11,526	14,710	18,774
Personal Income per Capita, 1957 $'s	2,832	3,260	3,787	4,443	5,242	6,194

* Actual + Estimated

[1] See footnote 1, Table III-4.

[2] Population estimates from Alberta Oil and Gas Conservation Board; assumed annual price inflator of 2.5 percentage points per year.

Source: Alberta Bureau of Statistics, **op. cit.,** for actual data.

TABLE III-6

ALBERTA PERSONAL INCOME, CURRENT AND CONSTANT (1957) DOLLARS, 1950 - 2005, ASSUMING 5% GROWTH RATE BEYOND 1970[1]

	1950*	1955*	1960*	1965*	1970+	1975+
Personal Income, Current $'s (millions)	930	1,438	2,085	2,888	4,646	6,628
Personal Income per Capita[2] Current $'s	1,019	1,318	1,615	1,992	2,927	3,764
Personal Income, 1957 $'s (millions)	1,209	1,538	1,967	2,477	3,404	4,448
Personal Income per Capita, 1957 $'s	1,325	1,410	1,524	1,708	2,144	2,526
	1980+	1985+	1990+	1995+	2000+	2005+
Personal Income, Current $'s (millions)	9,387	12,947	18,517	25,822	35,867	49,644
Personal Income per Capita, Current $'s	4,794	6,089	7,764	9,955	12,782	16,379
Personal Income, 1957 $'s (millions)	5,813	7,598	9,929	12,976	16,958	22,163
Personal Income per Capita, 1957 $'s	2,969	3,500	4,163	5,003	6,044	7,312

* Actual + Estimated

[1] See footnote 1, Table III-4.

[2] Population estimates from Alberta Oil and Gas Conservation Board; assumed annual price inflator of 2.5 percentage points per year.

Source: Alberta Bureau of Statistics, **op. cit.,** for actual data.

TABLE III-7

NET VALUE OF PRODUCTION OF PRIMARY AND SECONDARY BUSINESS SECTORS, ALBERTA, 1935 - 1969

	1935		1940		1945		1950		1955	
	$,000	%	$,000	%	$,000	%	$,000	%	$,000	%
Agriculture	79,394	53.9	147,781	58.5	212,707	52.8	331,066	44.1	332,403	25.9
Forestry	1,310	0.9	2,409	1.0	6,299	1.6	8,954	1.2	13,163	1.0
Fisheries	139	0.1	222	0.1	742	0.2	437	0.1	688	0.1
Trapping	1,065	0.7	1,893	0.7	2,067	0.5	1,889	0.3	2,078	0.2
Mining	16,069	10.9	27,851	11.0	41,713	10.3	122,543	16.3	303,752	23.7
Electric Power	4,572	3.1	5,810	2.3	8,227	2.0	13,863	1.8	28,858	2.2
Manufacturing	23,769	16.1	37,747	14.9	78,548	19.5	123,893	16.5	263,309	20.5
Construction	21,000	14.3	29,000	11.5	53,000	13.1	147,700	19.7	338,700	26.4
TOTAL	147,345	100.0	252,713	100.0	403,303	100.0	750,345	100.0	1,282,951	100.0

	1960		1965		1966		1967		1969+	
	$,000	%	$,000	%	$,000	%	$,000	%	$,000	%
Agriculture	329,278	21.4	509,563	22.9	655,178	25.2	523,031	19.2	620,000	19.2
Forestry	20,780	1.4	6,782	0.3	7,211	0.3	7,591	0.3	8,000	0.2
Fisheries	1,158	0.1	677	—	844	—	758	—	800	—
Trapping	2,070	0.1	1,887	0.1	1,776	0.1	1,549	0.1	2,000	0.1
Mining	349,115	22.7	690,524	31.1	772,079	29.7	895,205	32.8	1,093,000	33.9
Electric Power	48,587	3.2	69,389	3.1	74,231	2.9	77,763	2.8	100,000	3.1
Manufacturing	339,377	22.1	475,343	21.4	527,197	20.3	574,215	21.1	640,000	19.9
Construction	445,551	29.0	470,816	21.1	558,172	21.5	647,229	23.7	760,000	23.6
TOTAL	1,535,915	100.0	2,224,980	100.0	2,596,689	100.0	2,727,341	100.0	3,223,800	100.0

[1] Primary and secondary sectors as defined by Alberta Bureau of Statistics.

+ Estimated

Source: Alberta Bureau of Statistics, Department of Industry and Tourism, Government of Alberta, **Alberta Industry and Resources**, 1970 Edition.

TABLE III-8

SUMMARY OF INITIAL AND REMAINING RECOVERABLE CRUDE OIL RESERVES AS OF THE END OF EACH YEAR, 1948 - 1969

(millions of st. bbl.)

	Initial Proved Reserves	Annual Production	Cumulative Production	Remaining Reserves
1948	181	10.5	92.8	88.2
1949	470	19.7	113	357
1950	1,100	27.1	140	960
1951	1,380	45.8	185	1,195
1952	1,773	58.8	244	1,529
1953	2,192	76.7	321	1,871
1954	2,542	87.6	409	2,133
1955	2,971	112.8	521	2,450
1956	3,487	143.7	665	2,822
1957	3,738	136.8	802	2,936
1958	3,747	112.5	914	2,833
1959	4,172	128.8	1,043	3,129
1960	4,478	130.5	1,174	3,304
1961	4,840	157.8	1,331	3,509
1962	5,119	165.1	1,497	3,622
1963	5,475	168.7	1,665	3,810
1964	7,668	175.4	1,840	5,828
1965	8,101	183.7	2,024	6,077
1966	8,987	202.5	2,227	6,760
1967	9,586	230.2	2,457	7,129
1968	10,340	250.7	2,708	7,632
1969	10,683	279.2	2,987	7,695

Source: Oil and Gas Conservation Board Report 70-18, **op. cit.**

TABLE III-9

SUMMARY OF THE GROWTH OF INITIAL AND REMAINING ESTABLISHED RESERVES OF MARKETABLE GAS, 1948 - 1969

(billions of cubic feet)

	Initial Marketable Gas	Annual Production	Cumulative Production	Remaining Marketable Gas[1]	Remaining Marketable Gas[1] (1000 BTU basis)
1948	3,962	38	541	3,421	
1949	4,543	41	582	3,961	
1950	5,123	51	633	4,490	
1951	7,295	57	690	6,605	
1952	10,413	64	754	9,659	
June 30, 1953	11,972	68	822	11,150[2]	
1953	13,115	73	827	12,288	
May 31, 1954	14,068	82	909	13,159	
1954	15,202	88	915	14,287[3]	
June 30, 1955	16,174	53	968	15,206[4]	
1955	17,307	107	1,022	16,285	
Sept. 30, 1956	19,007	80	1,102	17,905[5]	
1956	19,598	115	1,137	18,461	
1957	21,962	135	1,272	20,690	
March 31, 1958	23,410	51	1,323	22,087[6]	23,300
1958	25,822	187	1,459	24,363	25,600
Sept. 30, 1959	27,899	171	1,630	26,269[7]	27,700
1959	28,963	253	1,712	27,251	—
1960	33,220	324	2,036	31,184	32,897
1961	33,691	423	2,459	31,232	33,027
1962	35,456	624	3,083	32,373	34,224
1963	36,727	697	3,780	32,947	34,784
1964	39,776	784	4,565	35,211	37,359
1965	42,960	858	5,423	37,537	40,092
1966	44,403	906	6,329	38,072	40,553
1967	47,025	976	7,305	39,720	42,222
1968	51,803	1,066	8,371	43,432	45,750
1969	54,909	1,342	9,718	45,196	47,655

[1] Reserve estimates are as of the year end except where specified otherwise.

[2] Initial Marketable Reserves as of June 30, 1953, less production to December 31, 1952.

[3] Initial Marketable Reserves as of March 31, 1954, less production to December 31, 1953.

[4] Initial Marketable Reserves as of June 30, 1955, less production to December 31, 1954.

[5] Initial Marketable Reserves as of September 30, 1956, less production to June 30, 1956.

[6] Initial Marketable Reserves as of March 31, 1958, less production to December 31, 1957.

[7] Initial Marketable Reserves as of September 30, 1959, less production to June 30, 1959.

Source: Oil and Gas Conservation Board Report 70-18, **op. cit.**

TABLE III-10

LABOR FORCE 15 YEARS OF AGE AND OVER BY INDUSTRY — ALBERTA 1951 and 1961, AND FOR MAJOR CITIES 1961

	Alberta 1951	Alberta 1961	Calgary 1961	Edmonton 1961	Lethbridge 1961	Medicine Hat 1961	Red Deer 1961	Others 1961
Agriculture	114,918	103,573	998	1,346	459	389	66	100,315
Forestry	1,709	2,784	76	129	4	1	7	2,567
Fishing and Trapping	974	839	12	23	1	1	—	802
Mines, Quarries and Oil Wells	15,723	17,350	6,942	2,839	90	54	248	7,177
Manufacturing	29,015	42,217	13,064	17,477	1,541	1,652	514	7,969
Construction	23,641	37,360	10,613	12,442	1,060	710	703	11,832
Transportation	29,956	42,809	10,734	13,392	1,418	961	577	15,727
Public Utilities	2,396	4,626	1,468	1,257	155	83	48	1,615
Trade	51,943	80,096	23,846	27,710	3,414	1,574	1,504	22,048
Finance, Insurance and Real Estate	7,957	14,695	5,566	5,467	551	269	282	2,560
(Non-Government Services) Community, Business, Personal Service	50,810	93,424	23,454	31,067	3,429	2,020	2,239	31,215
(Government Services) Public Administration	22,118	38,627	9,786	15,211	1,036	620	753	11,221
Industry — Unspecified or Undefined	2,337	11,111	2,697	3,216	296	214	183	4,505
TOTAL	353,497	489,511	109,256	131,576	13,454	8,548	7,124	219,553

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE III-11

CHANGES IN EMPLOYMENT BY INDUSTRIAL SECTOR, 1961 - 1969

Annual Averages of Estimates of Employees for Selected Industries	1961	% of Labor Force	1966	1967	1968	1969*	% of Labor Force
Forestry	2,200	0.4	2,500	2,300	1,700	22,400	0.3
Mines, Quarries and Oil Wells	16,700	3.4	18,500	19,100	20,300	22,400	3.6
Manufacturing	36,800	7.5	46,800	48,700	50,400	54,000	8.6
Construction	25,600	5.2	33,300	35,700	36,400	38,900	6.2
Transportation, Communication and Other Utilities*	43,300	8.8	48,500	49,600	48,900	52,200	8.3
Trade	57,700	11.8	73,600	77,200	80,800	85,200	13.6
Finance, Insurance and Real Estate	11,600	2.4	15,800	17,200	17,900	19,000	3.0
Community, Business and Personal Services	83,400	17.0	114,300	130,300	140,600	153,900	24.4
Public Administration and Defence	25,500	5.2	28,200	30,800	31,800	32,700	5.2
Total Selected Industries	302,900	61.7	381,500	410,800	428,800	460,200	73.2

*Based on preliminary data.

Source: Alberta Department of Industry and Tourism, **Annual Review of Business Conditions, 1969.**

TABLE III-12

ALBERTA LABOR FORCE BY MAJOR OCCUPATIONAL GROUPS, 1951 - 1961

	No. of Workers 1951	% of Total	No. of Workers 1961	% of Total	Annual Rate of Change, %
Management	28,350	8.0	41,691	8.5	3.9
Professional and Technical	23,874	6.8	46,579	9.5	6.9
Clerical	30,361	8.6	55,317	11.3	6.2
Sales	18,496	5.2	31,629	6.5	5.5
Service and Recreation	34,895	9.9	59,055	12.1	5.4
Transportation and Communication	18,829	5.6	28,261	5.8	3.6
Farmers and Farm Workers	114,926	32.5	104,162	21.3	— 1.0
Loggers, Trappers, Hunters, Fishermen	2,303	0.7	3,009	0.6	2.7
Miners and Related Workers	7,469	2.1	5,291	1.1	— 3.3
Craftsmen, Production and Related	54,177	15.3	83,449	17.1	4.4
Laborers	16,771	4.7	19,615	4.0	1.6
Occupation Not Stated	2,046	0.6	11,453	2.3	16.1
TOTAL	353,497	100.0	489,511	100.0	

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE III-13

ESTIMATED ALBERTA LABOR FORCE BY MAJOR OCCUPATIONAL GROUPS, 1975

	% of Total Labor Force Method A[1]	% of Total Labor Force Method B[2]
Management	9.2	9.8
Professional and Technical	16.5	16.3
Clerical	14.6	17.7
Sales	7.1	9.2
Service and Recreation	14.5	17.0
Transportation and Communication	6.0	6.4
Farmers and Farm Workers	10.2	10.5
Loggers, Trappers, Hunters, Fishermen	1.4	0.6
Miners and Related Workers	—	—
Craftsmen, Production and Related	19.3	20.7
Laborers	3.6	3.4
Occupation Not Stated	—	—

[1] Estimated for the Prairie Region by B. Ahamad, **A Projection of Manpower Requirements by Occupation in 1975**, Department of Manpower and Immigration, Canada, 1969.

[2] Projecting rate of change from 1951 to 1961, to 1975.

TABLE III-14

POTENTIAL OCCUPATIONAL REQUIREMENTS, ALBERTA LABOR FORCE, 1975 - 2005

(Number of Workers and Per cent of Total Labor Force)

	1961	1975	1980	1985	1990	1995	1999	2005
Labor Force as Per Cent of Population	36.8	41.3	42.6	44.0	45.0	46.0	47.0	48.0
Labor Force	489,511	727,123	833,996	955,132	1,073,165	1,193,108	1,298,659	1,454,962
Management	41,691	65,441	75,060	85,962	96,584	119,311	129,866	145,496
Per cent of Total Labor Force	8.5	9.0	9.0	9.0	9.0	10.0	10.0	10.0
Professional & Technical	46,579	116,340	133,439	152,821	182,438	202,828	233,759	276,443
Per cent of Total Labor Force	9.5	16.0	16.0	16.0	17.0	17.0	18.0	19.0
Clerical	55,317	101,797	116,759	133,718	150,243	167,035	181,812	203,695
Per cent of Total Labor Force	11.3	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Sales	31,629	50,899	58,380	66,859	75,122	83,518	90,906	101,847
Per cent of Total Labor Force	6.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Service & Recreation	59,055	101,797	116,759	133,718	160,975	178,966	207,785	232,794
Per cent of Total Labor Force	12.1	14.0	14.0	14.0	15.0	15.0	16.0	16.0
Transportation and Communication	28,261	43,627	50,040	57,308	64,390	71,568	77,920	87,298
Per cent of Total Labor Force	5.8	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Farmers and Farm Workers	104,162	72,712	83,400	95,513	85,853	83,518	77,920	72,748
Per cent of Total Labor Force	21.3	10.0	10.0	10.0	8.0	7.0	6.0	5.0
Loggers, Trappers, Hunters, Fishermen	3,009	7,271	8,340	9,551	10,731	11,931	12,987	14,550
Per cent of Total Labor Force	0.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Miners and Related Workers	5,291	7,271	8,340	9,551	10,731	11,931	12,987	14,550
Per cent of Total Labor Force	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Craftsmen	83,449	138,153	158,459	181,475	203,901	226,691	246,745	276,443
Per cent of Total Labor Force	17.1	19.0	19.0	19.0	19.0	19.0	19.0	19.0
Laborers	19,615	21,814	25,020	28,654	32,195	35,793	25,973	29,099
Per cent of Total Labor Force	4.0	3.0	3.0	3.0	3.0	3.0	2.0	2.0

Source: Labor Force Participation Rates to 1980 estimated by Illing, **op. cit.,** beyond 1980 assumed to reach 48 per cent in 2005, interpolated from 1980-2005. Percentages of labor force in each occupational group from Table III-13 and estimates for 1980-2005.

TABLE III-15

RATIO OF LABOR FORCE TO POPULATION, CANADA, 1951-1960

(Per cent)

	Ratio of Labor Force To Total Population			Ratio of Labor Force to Population 15-64*		
	Both Sexes	Males	Females	Both Sexes	Males	Females
1951	37.3	57.1	17.0	60.2	92.6	27.3
1961	35.8	51.9	19.3	61.2	88.9	34.9
1965	36.5	51.4	21.4	61.8	86.9	36.2
1970	39.2	52.8	25.4	64.0	86.1	41.6
1975	41.3	54.4	28.0	65.5	86.0	44.6
1980	42.6	55.6	29.5	66.7	86.5	46.5

* These figures are not directly comparable with the participation rates cited elsewhere in the Economic Council Study because of different definitions of the source population. Participation rates are defined there as the labor force as a percentage of the non-institutional population 14 years and over.

Source: Based on data from the Dominion Bureau of Statistics, **Labour Force Survey; idem, Vital Statistics**; and estimates by Economic Council of Canada. (In Illing, **et. al.,** Economic Council, **op. cit.,** p. 87).

TABLE III-16

RATIO OF LABOR FORCE TO POPULATION IN SELECTED COUNTRIES, 1962

(Per cent)

	Ratio of Labor Force to Total Population			Ratio of Labor Force to Population 15-64		
	Both Sexes	Males	Females	Both Sexes	Males	Females
Britain	47.7	64.9	31.4	73.1	97.7	49.0
France	42.3	57.9	27.4	68.2	91.1	45.3
Germany (F.R.)	47.8	64.2	33.1	72.0	96.7	49.7
Italy	41.3	61.0	22.5	60.8	90.3	33.2
Sweden	45.0	61.9	28.2	67.9	92.7	42.8
United States	40.0	54.5	25.9	67.2	91.5	43.5
Canada	36.3	52.7	19.5	62.0	90.2	33.3

Source: Based on data from B. Mueller, **A Statistical Handbook of the North Atlantic Area,** Twentieth Century Fund, 1965; and Dominion Bureau of Statistics. (**Ibid.**, p. 86.)

TABLE III-17

FEMALES AS A PERCENTAGE OF THE LABOR FORCE IN SELECTED COUNTRIES, 1962

Britain	33.8
France	33.3
Germany (F.R.)	36.4
Italy	27.8
Sweden	31.4
United States	32.8
Canada	27.2

Source: W. M. Illing, et al., Economic Council of Canada, **op. cit.**

TABLE III-18

MALE POPULATION, LABOR FORCE AND PARTICIPATION RATES, BY AGE GROUP FOR ALBERTA, 1951 - 1961

	15-19	20-24	25-34	35-44	45-54	55-64	65+	Total
1951								
Population	37,882	38,333	74,053	63,370	51,657	41,225	38,727	346,247
Labor Force	20,350	36,120	71,917	62,538	49,201	35,643	15,162	290,931
Participation Rate (%)	53.72	94.23	97.12	97.15	95.25	86.46	39.15	84.02
1961								
Population	50,296	44,403	100,414	87,593	67,212	48,052	40,850	448,420
Labor Force	23,135	40,137	95,931	83,957	63,071	40,389	15,161	361,961
Participation Rate (%)	46.00	90.80	95.54	95.85	93.84	84.05	29.82	80.65

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE III-19

FEMALE POPULATION, LABOR FORCE AND PARTICIPATION RATES, BY AGE GROUP FOR ALBERTA, 1951 - 1961

	15-19	20-24	25-34	35-44	45-54	55-64	65+	Total
1951								
Population	36,059	37,194	74,613	59,110	40,823	30,433	28,216	306,448
Labor Force	10,033	15,864	14,968	10,509	6,448	3,542	1,202	62,566
Participation Rate (%)	27.82	42.65	20.06	17.78	15.80	11.64	4.26	20.42
1961								
Population	48,708	44,751	92,157	85,030	61,335	35,591	42,228	413,800
Labor Force	14,765	20,948	27,651	29,274	22,690	10,037	2,185	127,550
Participation Rate (%)	30.31	46.81	30.00	34.43	36.99	25.35	5.17	30.82

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE III-20

PROJECTIONS OF POTENTIAL REQUIREMENTS IN PROFESSIONAL AND TECHNICAL OCCUPATIONS, 1975 - 2005

	1961	1975	1980	1985	1990	1995	1999	2005
Total Professional and Technical	46,579	116,340	133,439	152,821	182,438	202,828	233,759	276,443
1 — Professional Engineers	3,773	9,424	10,809	12,379	14,777	16,429	18,934	22,392
Civil	1,956	4,886	5,604	6,418	7,662	8,519	9,818	11,611
Mechanical (including Surveyors)	466	1,163	1,334	1,528	1,824	2,028	2,338	2,764
Industrial	140	349	400	458	547	608	701	829
Electrical	233	581	667	764	912	1,014	1,169	1,382
Chemical	186	465	534	611	730	811	935	1,015
2 — Biologists and Agricultural Professionals	745	1,861	2,135	2,445	2,919	3,245	3,740	4,423
Veterinarians	93	233	267	306	365	406	468	553
3 — Teachers	13,974	34,902	40,032	45,846	54,731	60,848	70,128	82,933
Professors and College Principals	699	1,745	2,001	2,292	2,737	3,042	3,506	4,147
School Teachers	13,275	33,157	38,031	43,554	51,994	57,806	66,642	78,786
4 — Health Professionals	11,365	28,387	32,559	37,288	44,515	49,490	57,037	67,452
Physicians and Surgeons	1,304	3,258	3,736	4,279	5,108	5,679	6,546	7,740
Dentists	326	814	934	1,070	1,277	1,420	1,636	1,935
Nurses, Graduate	5,263	13,146	15,078	17,269	20,615	22,920	26,415	31,238
Nurses in Training	1,584	3,955	4,537	5,196	6,203	6,896	7,948	9,399
Osteopaths and Chiropractors	140	349	400	458	547	608	701	829
Medical and Dental Technicians	1,956	4,886	5,604	6,418	7,662	8,519	9,818	11,611
5 — Law Professionals	838	2,094	2,401	2,751	3,284	3,651	4,208	4,976
Judges and Magistrates	47	116	133	153	182	203	234	276
Lawyers and Notaries	791	1,978	2,268	2,598	3,101	3,448	3,974	4,700
6 — Other Professional and Technical[1]	15,884	39,672	45,503	52,112	62,212	69,165	79,712	94,267

[1] Other Professional and Technical includes artists, writers and musicians; authors, editors and journalists; religious professionals; draughtsmen; actuaries and statisticians; librarians; interior decorators; photographers; and architects.

Source: Ahamad, **op. cit.** and calculated.

CHAPTER FOUR

EDUCATIONAL COSTS AND GOVERNMENT REVENUES IN ALBERTA, 1980 AND 2005

The primary objective of this chapter is to provide alternative estimates of cost levels and revenue flows under various sets of assumptions about educational enrolments, cost factors, and revenue systems. The chapter is tedious because of the large set of numbers derived from various assumptions.

Potential Costs Of Education

Primary and Secondary Schools

With an enrolment in the neighborhood of 400,000 in 1968-69, primary and secondary operational expenditures in that year totalled more than $262 million, or about $650 per student.[1]

Professor Hanson projects costs per student to increase at a rate of nearly 9 per cent per year to a level of $1,870 in 1981-82. For the 1980-81 school year, this figure is arbitrarily rounded off to $1,800 and used as a high estimate of per student costs for that year. The lower cost estimate for 1980-81 assumes a doubling of costs per student from 1968 to 1980 to $1,300 per year, an increase of a little less than 6 per cent per year.

Given these alternative assumptions, operating costs in 1980-81 will be

(1) 415,000 (projected enrolment) x $1,300= $539,500,000

or

(2) 415,000 x $1,800=$747,000,000.

For the year 2005, a slightly more complex set of assumptions is necessary. Assuming the low cost estimate for 1980-81—$1,300—and projecting this cost per student to increase at a rate of 3 per cent per year (about twice the rate of increase assumed for the overall price level, and including a modest quality improvement factor), yields a cost per student of $2,722.

(3) 612,000 (projected enrolment) x $2,722= $1,665,864,000.

If a low per student operating cost estimate for 1980—$1,300—is projected to increase at a rate of 5 per cent per year, the resulting cost per student is $4,402 per year. Thus,

(4) 612,000 x $4,402=$2,694,024,000.

On the other hand, if the high cost estimate per student for 1980-81 is assumed—$1,800—and projected to increase to 2005 at 3 per cent per year, the cost per student in 2005 would be $3,769. Thus,

(5) 612,000 x $3,769=$2,306,628,000.

The other possibility is the high cost estimate per student for 1980-81 — $1,800 — projected to increase at a rate of 5 per cent per year per student to 2005, which would yield a per student cost of $6,095. Thus,

(6) 612,000 x $6,095=$3,730,140,000.

Equation (4) is interesting in the sense that it projects from 1968-69 to 2005 at a rate of increase per student of between 5 and 6 per cent per year to establish a total primary and secondary cost of $539,500,000 in 1980 and $2,694,024,000 in 2005.

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[1] Eric J. Hanson, **Financing Education in Alberta**, Research Monograph No. 14, The Alberta Teachers' Association, 1969. In the analysis of primary and secondary school costs, operating expenditures are treated as the item of principal importance to educational policy makers. No reference to capital expenditures will be made beyond this footnote, since it is assumed that all primary and secondary school capital expenditures will be financed by borrowing. This being the case, the debt service charge included in operating expenditures is all the reference to capital costs that will be required. From a strict economic point of view, it would be more interesting to include the capital construction costs themselves since current allocation of Gross Provincial Product would have to consider this form of investment activity. From the point of view of educational finance, however, it is current operating expenditures that are important, as these are paid out of personal income. Since the only relevant charge against personal income in a given year is the debt service charge occasioned by debt, this debt service charge included in operating expenditures will provide adequate treatment of the problem of capital spending, again assuming all capital spending is financed by borrowing. The debt service charge, of course, must include amortization payments. Professor Hanson estimates total debt of about $800 million, capital investment of about $200 million, and annual debt service charges of about $90 million by 1981-82.

Primary and Secondary Costs With Kindergarten and Pre-School

In this section potential costs of primary and secondary education in 1980 and 2005 are re-estimated according to various assumptions relating to the availability of kindergarten and pre-school programs.

Based on the analysis in Chapter II, potential kindergarten enrolment according to specified assumptions about participation rates in 1980-81 would be 24,129. Assuming the same potential cost structure for kindergarten students as for other primary and secondary students,

(7) 24,129 (projected enrolment) x $1,300= $31,367,700.

$31,367,700 + $539,500,000 (equation 1) = $570,867,700.

This total represents the low cost estimate for 1980 for a primary and secondary system that includes a kindergarten program.

Correspondingly, if the higher cost estimate per student for 1980-81 — that is $1,800 — is assumed:

(8) 24,129 x $1,800=$43,432,200.

$43,432,200 + $747,000,000 (equation 2) = $790,432,200.

This total represents the high cost estimate for 1980 for a primary and secondary system that includes a kindergarten program.

For the year 2005, again the procedure is slightly more complicated. In Chapter II, kindergarten enrolment projected for 2005 of 54,267 was based on an assumed participation rate of 101 per cent. Assuming the low cost per student estimate for 1980, $1,300, and projecting it to increase to 2005 at a rate of 3 per cent per year, the cost per student, as noted previously, would be $2,722. Thus

(9) 54,267 (projected enrolment) x $2,722= $147,714,774

$147,714,774 + $1,665,864,000
(equation 3) =$1,813,578,774.

This figure represents a low cost estimate for a primary and secondary school program in 2005 that includes kindergarten.

Projecting the low cost estimate for 1980-81 to increase at a rate of 5 per cent per student per year to 2005, the $4,402 cost per student yields

(10) 54,267 x $4,402=$238,883,334
$238,883,334 + $2,694,024,000
(equation 4) =$2,932,907,334.

Projecting the high cost estimate per student for 1980-81 to increase at a rate of 3 per cent per year per student to 2005 yields a per student cost of $3,769. Thus,

(11) 54,267 x $3,769=$204,532,303
$204,532,303 + $2,306,628,000
(equation 5) =$2,511,160,303.

Equation (11), like equation (10), represents an intermediate cost estimate for primary and secondary education with a kindergarten program in 2005.

Projecting the high cost estimate per student for 1980-81 to increase at a rate of 5 per cent per year per student to 2005 results in a per student cost of $6,095. Thus,

(12) 54,267 x $6,095=$330,757,365
$330,757,365 + $3,730,140,000
(equation 6) =$4,060,897,365.

This represents the high cost estimate for a primary and secondary school system in 2005 that includes a kindergarten program.

The next set of six equations considers primary and secondary systems costs that include pre-school in addition to kindergarten programs.

For 1980, as derived in Chapter II, potential pre-school enrolment would be 50,519 students. Applying this enrolment estimate to the low cost estimate,

(13) 50,519 x $1,300=$65,674,700
$65,674,700 + $570,867,700
(equation 7) =$636,542,400.

This figure represents the low cost estimate for 1980 for a primary and secondary system that includes both a kindergarten and a pre-school program.

Also for 1980, if the high cost estimate per student is carried over to the pre-school enrolment,

(14) 50,519 x $1,800=$90,934,200
$90,934,200 + $790,432,200
(equation 8) =$881,366,400.

This total represents the high cost estimate for 1980 for a primary and secondary school program that includes both kindergarten and pre-school.

For the year 2005, a projected pre-school enrolment of 111,004 was derived by assuming a 101 per cent participation rate for 3- and 4-year-old children. If the low cost estimate of $2,722 per student, derived by projecting an increase of 3 per cent per year per student in the low cost estimate for 1980 to increase 3 per cent per year per student, occurs,

(15) 111,004 (projected enrolment) x $2,722=
$302,152,888
$302,152,888 + $1,813,578,774
(equation 9) =$2,115,731,662.

This figure represents the low cost estimate of a primary and secondary school system in 2005 that includes both kindergarten and a pre-school program.

If the low cost per student estimate of 1980 is projected to increase at a rate of 5 per cent per year to 2005, costs per student are $4,402. Thus,

(16) 111,004 x $4,402=$488,639,608
$488,639,608 + $2,932,907,334
(equation 10) =$3,421,546,942.

This total is an intermediate cost estimate for 2005 for a primary and secondary school system with both kindergarten and pre-school programs.

If the high per student cost estimate for 1980 is projected to increase at a rate of 3 per cent to 2005,

(17) 111,004 x $3,769=$418,374,076
$418,374,076 + $2,511,160,303
(equation 11) =$2,929,534,379.

This figure represents a higher intermediate cost estimate for 2005 for a primary and secondary school system which includes both kindergarten and pre-school activities.

Finally, if the high per student cost estimate for 1980 is projected to increase at a rate of 5 per cent per year to 2005,

(18) 111,004 x $6,095=$676,569,380
$676,569,380 + $4,060,897,365
(equation 12) =$4,737,466,745.

This total is the high estimate for a 2005 primary and secondary system that includes both kindergarten and pre-school programs.

The complementary sets of equations are as follows:

Low estimate, 1980—(1), (7), and (13)
High estimate, 1980—(2), (8), and (14)
Low estimate, 2005—(3), (9), and (15)
Intermediate estimate, 2005 (low 1980 projected at 5 per cent)—(4), (10), and (16)
Intermediate estimate, 2005 (high 1980 projected at 3 per cent)—(5), (11), and (17)
High estimate, 2005—(6), (12), and (18)

Equations (4), (10), and (16) are based on projected cost increases per student per year of slightly less than 6 per cent between 1968 and 1980 and 5 per cent between 1980 and 2005.

University Cost Projections

In Chapter II, university enrolment in Alberta was estimated with single parameters for 1980 and 2005. The 1980 enrolment projection for full-time students was based on the medium estimate of the Universities Commission. The 2005 enrolment projection for full-time students was based on the assumption that the university participation rate for the 18-24 age group would increase gradually to 34.4 per cent by 2005.

For purposes of estimating university costs for 1980 and 2005, alternative sets of assumptions are made about university enrolments based on low, medium, and high participation rates. Thus, the low enrolment for 1980 is based on the assumption that the participation rate of the 18-24 age group will not increase, but will remain at the 18 per cent level to 1980. Given an estimated 18-24 population of 272,656 in 1980, this participation rate yields an enrolment in universities of 49,078.

The medium projection of university enrolment for 1980 is the same as that discussed previously as projected by the Universities Commission. It assumes a 21.5 per cent participation rate for the 18-24 age group, and yields an enrolment estimate of 58,615.

The high projection of university enrolment is based on the assumption that the participation rate of the 18-24 age group will increase to 25 per cent by 1980. This provides a projected university enrolment of 68,164.

The same methods are applied to the enrolment projections for 2005. The low projection is based on the assumption that the participation rate among the 18-24 age group will increase very slowly from 18 to 21.5 per cent between 1980 and 2005. With a projected population of 351,683 in this age group, enrolment would then total 75,611.

Alternatively, the medium estimate is as projected and discussed in Chapter II, a participation rate of 34.4 per cent in 2005 and a projected enrolment of 120,978.

The high enrolment projection for 2005 is based on the assumption that the participation rate of the 18-24 age group in universities will increase to 40 per cent by 2005. This assumption yields an enrolment total of 140,673.[1]

To these enrolment projections are added various assumptions about the costs of university education. For 1980, a low cost estimate is derived in the same manner that the low cost estimate was derived for primary and secondary school costs. That is, costs per student are assumed to double between 1968 and 1980. Operating costs per student in Alberta universities in 1968 were $2,800. This did not include a debt service charge, since capital expenditure has not been, and by assumption will not be, financed by borrowing, but rather through current revenues. Capital costs will be projected separately. If this $2,800 per student cost is doubled between 1968 and 1980, which amounts to an annual increase of slightly less than 6 per cent per student, operating costs per student will be $5,600 in 1980.[2]

Alternatively, consistent with the primary and secondary school analysis, if costs per student increase at a rate of about 9 per cent per year, the high cost estimate per student in 1980 is $8,000. This is nearly three times the per student operating costs of 1968.

Operating Costs, 1980. A first cost projection for 1980 is based on a combination of the low enrolment estimate for 1980 and the low cost estimate. Thus,

(19) 49,078 (low projected enrolment) x $5,600 (low projected cost) =$274,836,800.
Alternatively,

(20) 49,078 x $8,000 (high projected cost) = $392,624,000.

This equation derives from the low enrolment estimate and the high cost estimate for operating expenditures in 1980.

(21) 58,615 (medium enrolment projection) x $5,600=$328,244,000.

This figure derives from the medium enrolment projection and the low cost per student estimate of operating costs for 1980.

(22) 58,615 x $8,000=$468,920,000.

This total represents the combination of medium enrolment estimates and high per student cost estimates for operating expenditures in 1980.

(23) 68,164 (high enrolment estimate) x $5,600=$381,718,400.

This equation derives from the high enrolment estimate and the low cost per student estimate for operating expenditures in 1980.

(24) 68,164 x $8,000=$545,312,000.

This final figure for 1980 operating expenditures is based on the high enrolment estimate and the high cost per student projection.

Capital Costs, 1980. As mentioned previously, it is postulated in the case of elementary and secondary schools that all capital expenditure is financed from borrowing. On the other hand, it is assumed in the case of universities that all capital expenditures will be financed by current revenue flows rather than from borrowing. The source of revenues will be discussed in a later section.

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[1] The reader may want to compare these participation rate assumptions with the assumptions made by the Ontario Commission on Post-Secondary Education. The Commission's relevant assumptions for 1981 and 1991 vary between 40 and 80 per cent of the 18-21 year "cohort." See Ontario Commission on Post-Secondary Education, **op. cit.**

[2] Total costs, operating costs, and capital costs will all be calculated in terms of full-time students. Thus no separate calculation for part-time students is necessary.

Capital cost projections for 1980 are derived as follows. A basic low estimate for university capital construction of $72 million is assumed. This figure is derived by doubling the average capital expenditures of $36 million by all provincial universities between 1964 and 1969. The 1964-1969 average is used because of the large year-to-year variation in this kind of spending. The doubling of capital costs is based on the medium enrolment assumption that enrolment in Alberta universities will approximately double between 1968 and 1980. A variation of this low capital cost estimate is based on the low enrolment assumption. If enrolment increases by only about 70 per cent, as called for by the low projection, rather than doubling between 1968 and 1980, the low variation of the low capital cost estimate will permit only a 70 per cent increase in capital costs. This would be about $25 million rather than $36 million, and total capital spending in 1980 would then be held to $36 million, the 1964-1969 average, plus $25 million, or $61 million by 1980.

Correspondingly, the low capital cost formula must be adjusted for the high projection of 1980 enrolment. The high enrolment projection calls for an enrolment in provincial universities of 68,164. This is 2.3 times the enrolment of 1968: the low capital construction estimate for 1980 should be correspondingly increased. This yields a higher variation of the low capital cost projection of $84,240,000 rather than the $72 million based on the medium enrolment projection.[1]

The high estimate for capital costs in 1980 is less tedious. It is based on the simple assumption that capital costs will represent one-half the operating costs.

Thus, the low capital cost projection for 1980 is derived:

(25) 70 per cent of $36 million=$25 million + $36 million=$61 million.

This equation combines the low capital cost projection method with the low enrolment estimate for 1980.

(26) $392,624,000 x .50=$196,312,000.

This total is found by taking the high method for calculating capital costs—one-half of operating costs—in relation to the low enrolment estimate and the high cost per student estimate for 1980: i.e., equation (20) multiplied by .50.

(27) 2 x $36,000,000=$72,000,000.

This is the 1964 to 1969 average of capital construction costs at provincial universities of $36,000,000 multiplied by 2, corresponding to the assumed doubling of enrolment from 1968 to 1980. It is, therefore, based on the medium enrolment estimate and the assumption that capital costs should increase in the same percentage that enrolment is expected to increase between 1968 and 1980.

(28) $468,920,000 x .50=$234,460,000.

This figure derives from the high projection method for estimating capital costs, the medium enrolment estimates for 1980, and the high estimate of costs per student in 1980 [equation (22)] multiplied by .50.

(29) 2.34 x $36,000,000=$84,240,000.

This equation combines the low method of projecting capital costs with the high enrolment estimates for 1980. The 2.34 is the factor by which enrolment is expected to increase according to the high enrolment estimate. The $36 million is the average capital cost in Alberta universities from 1964 to 1969.

(30) $545,312,000 x .50=$272,656,000.

This equation derives from the high projection method for estimating capital costs, the high enrolment projection for 1980, and the high cost estimate for 1980 [equation (24)] multiplied by .50.

Equations (25)-(30) are illustrative of capital cost projections that can be made on the basis of high and low capital cost projection methods; high, medium, and low enrolment estimates; and high and low cost estimates. Other combinations of these three sets of variables are possible.

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[1] In order to simplify calculations, the estimated enrolment of about 58,000 in 1980 has been treated as a doubling of enrolment from 1968-69. Thus, all the capital cost projections are based on this doubling assumption. Actually, enrolment in 1968-69 was less than 29,000 but the difference will not seriously bias the results of the low capital construction estimates, since they tend to increase the capital expenditure projections only slightly. Thus, in 1980 for the low enrolment estimate, the growth of enrolment is assumed to be 20,000—from 29,000 to 49,000—and this has been carried through the calculations at the 70 per cent level of increase. Similarly, the high enrolment estimate for 1980 is based on a 29,000 assumed enrolment for 1968 and the 2.3 factor—precisely 2.34—is based on an increase from 29,000, assumed, in 1968, to 68,000, projected for 1980.

Total University Costs, 1980. To estimate total university costs for 1980, it is possible to combine projected operating costs with projected capital costs in a variety of ways. The following total cost estimates for 1980 are illustrative:

(31) $272,836,800—equation (19)
61,000,000—equation (25)
$335,836,800

This figure combines the lowest operating cost projection with the lowest capital cost projection.

(32) $392,624,000—equation (20)
196,312,000—equation (26)
$588,936,000

This total combines the low enrolment and high per student cost estimates for operating expenditures with the high capital costs projection method in relation to these operating costs.

(33) $328,244,000—equation (21)
72,000,000—equation (27)
$400,244,000

This figure combines the medium enrolment projection and low per student cost estimate for operating expenditures with the low method of determining capital costs and the medium enrolment projection.

(34) $468,920,000—equation (22)
234,460,000—equation (28)
$703,380,000

This total combines the medium enrolment projection with the high per student cost projection to determine operating costs with the high method for determining capital costs in relation to this set of operating costs.

(35) $381,718,400—equation (23)
84,240,000—equation (29)
$465,958,400

This figure combines the high enrolment estimates with low per student costs in determining operating costs with the low method of projecting capital costs in relation to the high enrolment projection.

(36) $545,312,000—equation (24)
272,656,000—equation (30)
$817,968,000

This total combines the highest operating cost projection with the high method of projecting capital costs.

One other illustrative combination of capital and operating costs is

(37) $328,244,000—equation (21)
164,122,000—equation (21) x .50
$492,366,000

This figure combines the medium enrolment projection with the low per student cost estimate of equation (21) with the high method for determining capital cost projections. The set of operating and capital cost projections can be combined in still other ways, each reflecting provincial government, local government, and general community attitudes about enrolment, costs, and projection methods.

In Chapter II, university enrolment estimates for 2005 totalled 120,978, based on the assumption that the participation rate of the 18-24 age group would increase from 21.5 per cent in 1980 to 34.4 per cent in 2005, an assumption based essentially on the extrapolation of the assumed rate of change in participation rates between 1968 and 1980 and in consideration of the Economic Council of Canada Study.[1] For purposes of estimating university costs for 2005, however, various postulates are made relating to participation rates, and a set of enrolment projections are derived accordingly.

The low enrolment projection for 2005 is based on the assumption that the postulated 18 per cent participation rate of 1980 will grow slowly to 21.5 per cent in 2005.[2] With an estimated population of 351,683 in the 18-24 age groups, this low participation rate assumption yields a low enrolment projection of 75,611 full-time students in 2005. Alternatively, the high enrolment projection for 2005 is based on the assumption that the participation rate of the 18-24 age group in universities will grow beyond the 34.4 per cent built into the medium assumption and reach a 40 per cent level. This assumption yields a high enrolment projection of 140,673.

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[1] Zsigmond and Wenaas, op. cit.

A first set of operating and capital cost projections for 2005, based on these variable enrolment projections, will be based on an assumed increase of 3 per cent per year in operating costs per student from 1980 to 2005. Subsequently, this rate of increase will be changed to 5 per cent.

Operating Costs, 2005, at 3 Per Cent

(38) 75.611 (low projected enrolment) x $11.611 (low per student operating cost estimate for 1980 projected at 3 per cent growth rate)=$885.782.865

This figure combines the low enrolment projection for 2005 with the low per student operating cost estimate for 1980 at a projected increase rate of 3 per cent per student per year to 2005.

(39) 75.611 x $16.750 (high per student cost estimate for 1980 projected to increase at 3 per cent growth rate)= $1.266.484.250

This total represents the low enrolment projection for 2005 and the high per student cost estimate for 1980 at a projected increase rate of 3 per cent per year per student.

(40) 120.978 (medium projected enrolment) x $11.611=$1.417.257.270.

This figure is based on the medium projected enrolment for 2005 and the low per student cost estimate of 1980, projected at 3 per cent.

(41) 120,978 x $16.750=$2.026.381.500.

This total combines the medium growth rate in enrolment estimate with the high per student cost estimate of 1980, at a projected increase rate of 3 per cent.

(42) 140,673 (high projected enrolment) x $11,715=$1,647,984,195.

This figure is derived from the high projected enrolment for 2005 and the low per student cost estimate of 1980, at a projected increase rate of 3 per cent per year per student.

(43) 140,673 x $16,750=$2,356,272,750.

This total is based on the high projected enrolment figure and the high per student cost figure of 1980, projected at 3 per cent.

Capital Costs, 2005, at 3 Per Cent. The method for estimating capital costs at universities in 2005 is simpler than the method used for 1980. The low capital cost projection is based on the assumption that capital costs will represent 25 per cent of operating costs, the high projection on the assumption that capital costs will represent 25 per cent of operating costs, the high projection on the assumption that capital cost will represent 50 per cent of operating costs. Thus, the high method for estimating capital costs for 2005 is the same as the high method used for 1980.

Neither of these methods is extravagant in view of Alberta's recent experience. The operating costs of all universities in the province in 1968, for example, was less than twice as large as the capital construction cost average between 1964 and 1969. On the other hand, there should be occasional gaps in the need for vast capital expenditure growth in provincial universities, for example, during the 1980's, when enrolment is expected to increase very slowly because of the relatively small projected increases in the 18-24 age group population. In these circumstances, capital construction will be designed to replace, improve, and update existing facilities rather than to provide for massive continuous increases in the number of students.

While various combinations of cost and enrolment assumptions can be used, the following six equations illustrate the possible derivations of capital cost estimates for 2005:

(44) $885.782.865 (equation 39) x .25= $221.445.716.

This figure represents the lowest operating cost estimate for 2005 and the low method for estimating capital costs.

(45) $1.266.484.250 (equation 39) x .50= $633.242.125.

This total is derived from the low enrolment projection for 2005 in relation to the high per student operating cost estimate for 1980, at a projected increase rate of 3 per cent per year per student, all in relation to the high method of estimating capital costs.

(46) $1,417,257,270 (equation 40) x .25= $354,314,318.

This estimate is based on the medium enrolment projection for 2005 in relation to the low operating cost per student estimate for 1980, at a projected increase rate of 3 per cent, all in relation to the low method for estimating capital costs.

(47) $2,026,381,500 (equation 41) x .50=
$1,013,190,750.

This figure is determined by taking the medium enrolment estimate for 2005 in relation to the high per student operating costs for 1980, at a projected increase rate of 3 per cent, in relation to the high capital cost projection method.

(48) $1,647,984,195 (equation 42) x .25=
$411,996,049.

This total derives from the high enrolment estimate for 2005, the low per student operating costs for 1980 projected at 3 per cent, and the low method for estimating capital costs.

(49) $2,356,272,750 (equation 43) x .50=
$1,178,136,375.

This figure is based on the high enrolment estimate for 2005, the high per student operating costs for 1980 projected at 3 per cent, and the high method for estimating capital costs.

Total University Costs, 2005, at 3 Per Cent. In order to minimize the tedium of interpreting these operating and capital cost projections, three combinations of elements are derived to illustrate potential total costs in 2005.

The lowest possible total cost based on the above set of operating and capital cost projections is

(50) $ 884,782,865—equation (38)
221,445,716—equation (44)
$1,107,228,581

This represents the lowest enrolment estimate for 2005 combined with the lowest per student operating cost estimate for 1980 projected at 3 per cent in relation to the low method for determining capital costs.

(51) $1,417,257,270 equation (40)
354,314,318—equation (46)
$1,771,571,588

This is also a low estimate, based on the medium enrolment projections for 2005, the low per student operating cost estimate for 1980 projected at 3 per cent, and the low method for determining capital cost projections.

(52) $2,356,272,750—equation (43)
1,178,136,375—equation (49)
$3,534,409,125

This is the highest potential cost estimate from equations 38-49, based on the high enrolment projection, the high per student operating costs of 1980 projected at 3 per cent, and the high method for determining capital cost projections.

Operating Costs, 2005, at 5 Per Cent. Equations 38-52 were all based on the assumption that the increase in per student operating costs per year between 1980 and 2005 would be held to 3 per cent. This represents a rate of increase that is approximately twice the inflation factor built into income and product estimates and thus allows for per student cost increases about twice as large as the assumed inflation factor.

The following set of estimates is based on the assumption that per student operating costs will increase at a rate of 5 per cent per year between 1980 and 2005, a rate closer to, but still smaller than, Alberta's recent increases in per student costs of education:

(53) 75,611 (low projected enrolment) x $18,964 (low estimated cost per student in 1980 projected to increase at a rate of 5 per cent per year per student between 1980 and 2005) =$1,433,887,004.

This figure is based on the low projected enrolment for 2005, the low per student operating cost estimate for 1980 ($5,600), at a projected increase rate per cent.

(54) 75,611 x $27,091 (the high estimated operating cost per student in 1980, and projected increase rate of 5 per cent per year per student between 1980 and 2005) = $2,048,377,601.

This total derives from the low enrolment estimate for 2005, the high per student operating cost estimate for 1980 ($8,000), projected at 5 per cent per year per student to 2005.

(55) 120,978 (medium enrolment projection) x $18,964 = $2,294,226,792.

This figure represents a combination of the medium enrolment projection and the low per student operating cost estimate for 1980 projected at 5 per cent.

(56) 120,978 x $27,091 = $3,277,414,998.

This estimate is based on the medium enrolment projection and the high per student operating cost estimate for 1980 projected at 5 per cent.

(57) 140,673 (high enrolment projection) x $18,964 = $2,667,722,772.

This total derives from the high enrolment projection and the low per student operating cost estimate for 1980, projected at 5 per cent.

(58) 140,673 x $27,091 = $3,810,972,243.

This high estimate is based on the high enrolment projection for 2005 and the high per student operating cost estimate for 1980, projected at 5 per cent.

Capital Costs, 2005, at 5 Per Cent

(59) $1,433,887,004 (equation 53) x .25 = $358,471,751.

This is the lowest estimated capital cost, based on the low enrolment projection, the low 1980 per student operating cost estimate projected at 5 per cent, and on the low method of estimating capital costs.

(60) $2,048,377,601 (equation 54) x .50 = $1,024,188,801.

This estimate combines the low enrolment projection for 2005 with the high per student operating cost for 1980, projected at 5 per cent with the high method of estimating capital costs.

(61) $2,294,226,792 (equation 55) x .25 = $573,556,698.

This figure is derived from the medium enrolment projection, the low per student operating cost estimate for 1980 projected at 5 per cent, and the low method of estimating capital costs.

(62) $3,277,414,998 (equation 56) x .50 = $1,638,707,499.

This total is based on the medium enrolment projection, the high per student operating cost estimate for 1980 projected at 5 per cent, and the high method of estimating capital costs.

(63) $2,667,722,772 (equation 57) x .25 = $666,930,693.

This estimate combines the high enrolment projection for 2005, the low per student operating cost estimate for 1980 projected at 5 per cent, and the low method of determining capital cost estimates.

(64) $3,810,972,243 (equation 58) x .50 = $1,905,486,121.

This is the highest cost combination possible from the elements described above, based on the high enrolment projections, the high per student operating cost estimate for 1980 projected at 5 per cent, and the high method of determining capital cost estimates.

Total Costs, 2005, at 5 Per Cent.

Again, a large number of combinations of operating and capital cost estimates is possible. The following four equations illustrate the total cost possibilities:

(65) $1,433,887,004 — equation (53)
358,471,751 — equation (59)
$1,792,358,755

This is the lowest possible combination of operating and capital costs that can be derived from the previous set of equations.

(66) $2,294,226,792 — equation (54)
573,556,698 — equation (60)
$2,867,783,490

This is a modest total cost estimate, based on medium enrolment projections, low per student operating costs in 1980 projected at 5 per cent, and the low capital cost projection method.

(67) $3,810,972,243 — equation (58)
1,905,486,121 — equation (64)
$5,716,458,364

This is the highest total cost figure that can be derived from projected operating and capital costs in equation (53) — (64).

An alternate estimate can be derived by taking the medium enrolment projections for 2005, the low cost estimate for 1980 projected at 5 per cent, and the high method for determining capital cost estimates. Thus,

(68) $2,294,226,792 — equation (55)
1,147,113,396 — equation (55) x .50
$3,441,340,188

Non-University Post-Secondary Cost Projections

In Chapter II. non-university post-secondary enrolment in Alberta was projected at a single value for 1980 and 2005. The 1980 enrolment was based on projections made in the study by the Economic Council of Canada. The enrolment projection for 2005 was based on the assumption that the relationship between university and non-university post-secondary enrolment would stabilize at 47 per cent between 1980 and 2005. i.e.. that non-university post-secondary enrolment would represent a constant 47 per cent of university enrolment from 1980 to 2005. According to this assumption. the participation rate of the 18-24 age group in non-university post-secondary institutions would increase from 3.5 in 1966 to 10.1 in 1980 to 16.2 per cent in 2005.

In making cost estimates for this sector of education to 1980 and 2005. alternative sets of assumptions are provided. based on low. medium. and high participation rates. The low enrolment estimate for 1980 is based on an assumed participation rate of only 6.4 per cent for the 18-24 age group. With an estimated 18-24 population of 272.656 in 1980. this participation rate gives a low enrolment projection of 17.450. The medium participation rate is the same as that discussed in Chapter II. 10.1 per cent of the 18-24 age group with an enrolment total of 27.600. The high assumed participation rate is 15 per cent and yields an enrolment estimate of 40.898 in non-university post-secondary education.

Essentially the same method is used in deriving a range of enrolment estimates for 2005. The low projection is based on a participation rate that grows to only 12 per cent by 2005 and gives an enrolment projection of 42.202. given the estimated size of the 18-24 age group of 351.683. The medium projection is that discussed in Chapter II. a participation rate of 16.2 per cent by 2005. giving an enrolment estimate of 56.980. The high projection is based on an assumed participation rate of 20 per cent. and the resultant enrolment estimate is 70.337.

In addition to these enrolment projections it is necessary to specify assumptions about the operating and capital costs of non-university post-secondary education. These cost elements are derived in the same way that the cost elements for primary. secondary. and university education were derived. In the first instance. operating costs per student for this sector of education are assumed to be half the operating costs of universities on a per student basis. The assumption is generally consistent with available data on per student operating costs in this sector. Thus. operating costs per student are assumed to be $1.400 in 1968. and the low estimate for 1980 is based on a doubling of these costs to $2.800 per student. a rate of slightly less than 6 per cent. The high cost estimate per student is again assumed to be 50 per cent of the high operating costs in universities per student (half of $8.000), $4.000.

Beyond 1980. projecting an increase in per student operating costs of 3 per cent per year from 1980 to 2005 yields a figure of $5.863 based on the low ($2.800) estimate for 1980. and a figure of $8.375 based on the high ($4.000) estimate for 1980. Correspondingly. projecting an increase rate in 1980 costs of 5 per cent per student per year from 1980 to 2005 yields a figure of $9.482. based on the low ($2.800) estimate for 1980 and a per student operating cost of $13.545. based on the high ($4.000) per student operating cost estimate for 1980.

Operating Costs, 1980.

(69) 17.450 (low enrolment projection) x $2.800 (low estimate for per student operating costs) = $48.860.000.

This estimate results from the lowest 1980 enrolment projection in combination with the low projection of per student operating costs. doubled from the estimated 1968 level.

(70) 17.450 x $4.000 (high estimate for per student operating costs) = $69.800.000.

This figure is derived from the low enrolment projection and the high per student cost estimate for 1980 ($1.400 estimated for 1968. at a projected increase rate of about 9 per cent per year per student.

(71) 27.600 (medium enrolment estimate) x $2.800 = $77.280.000.

This figure is a product of the medium enrolment estimate and the low per student cost estimate.

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[1] Zsigmond and Wenaas, op. cit.

(72) 27,600 x $4,000 = $110,400,000.

This total is determined by using the medium enrolment estimate for 1980 in conjunction with the high per student operating cost estimate.

(73) 40,898 (high enrolment estimate) x $2,800 = $114,514,400.

This estimate is based on the high enrolment estimate and the low per student operating cost projection.

(74) 40,898 x $4,000 = $163,592,000.

This is the highest estimate of operating costs in 1980, resulting from the high enrolment estimate and the high per student operating cost assumption.

Capital Costs, 1980.

Capital costs in 1980 are projected by two methods, similar to the methods used in estimating university capital costs for 1980. The low estimating method is based on the assumption that enrolment in non-university post-secondary education will be about half that of universities. The low method for estimating university capital costs was based on the medium enrolment projections, which called for approximately twice the present university enrolment. Accordingly, capital expenditures for universities in 1980 according to the low method of calculation were based on a doubling of the average capital expenditures from 1964-1969 of about $36 million. Thus, university capital costs via this low method were projected at a $72 million level. As a result, the low method of calculating capital costs for non-university post-secondary education projects these capital costs to be $36 million in 1980, half the university amount because projected enrolment is about half. This $36 million is based on the low method and the medium enrolment estimate.

Accordingly, the first capital cost projection for 1980 for non-university post-secondary education must correct for the lower projected enrolment. Thus,

(75) 17,450 (the low enrolment projection) ÷ 27,600 (the medium enrolment projection) = .63

.63 x $36,000,000 = $22,680,000.

This figure results from the low method of calculating capital costs in relation to the low enrolment estimate for 1980.

(76) $69,800,000 x .50 = $34,900,000.

The high method of projecting capital costs for this sector of education is the same as the high method used in projecting university capital costs. It is based on the assumption that capital costs will represent 50 per cent of operating costs. The figure of $69,800,000 is obtained by taking the low enrolment estimate and the high per student operating cost estimate for 1980.

(77) 50 per cent of projected university capital costs = $36,000,000.

This figure is based on the medium enrolment projection for non-university post-secondary education as being about half the university enrolment; thus, capital costs are assumed to be equal to half the university capital costs for 1980, determined by the low method of estimating capital costs.

(78) $110,400,000 x .50 = $55,200,000.

This estimate derives from the medium enrolment projections to 1980, the high cost per student operating cost estimate, and the high capital cost projection method.

(79) 40,898 (the high projected enrolment) ÷ 27,600 = 1.48

1.48 x $36,000,000 = $53,280,000.

This figure reflects the high enrolment estimate for 1980, which is 1.48 times the medium enrolment estimate. The medium enrolment estimate and the low method of calculating capital costs yielded a capital cost projection of $36,000,000.

(80) $163,592,000 x .50 = $81,796,000.

This total is based on the high enrolment estimate for 1980, the high per student operating cost estimate for 1980, and the high projection method for determining capital costs.

Total Costs, 1980.

Again, these sets of operating cost and capital cost estimates can be combined in a large variety of ways. The following equations illustrate various methods of estimating total costs:

(81) $ 48,860,000 — equation (69)
22,540,000 — equation (75)
$ 71,540,000

This total cost potential is based on the lowest method of determining both operating and capital costs.

(82) $ 77,280,000 — equation (71)
36,000,000 — equation (77)
$113,280,000

This total cost estimate derives from the medium enrolment estimate, the low per student cost estimate, and the low method of determining capital costs.

(83) $163,592,000 — equation (74)
81,796,000 — equation (80)
$245,388,000

This is the highest total cost estimate possible from equations 69 to 80. It is based on the high enrolment projection, the high per student operating cost projection, and the high method of estimating capital costs.

A fourth variation of total cost estimates for 1980 yields:

(84) $ 77,280,000 — equation (71)
38,640,000 — equation (71) x .50
$115,920,000

In this case, the medium enrolment estimate and the low per student operating cost estimate produce an operating cost estimate as in equation (71) of $77,280,000 and the capital cost estimate is made by assuming capital costs equal to 50 per cent of operating costs.

Operating Costs, 2005, at 3 Per Cent.

As was the case for universities, operating and therefore capital and total costs for 2005 will be estimated according to two cost assumptions. The first assumption is that operating costs per student will increase at a rate of 3 per cent per year from 1980 to 2005. The second assumption, to be treated in the next section, is that operating costs per student will increase at a rate of 5 per cent per year from 1980 to 2005.

(85) 42,202 (low enrolment estimate) x $5,863
= $247,430,326.

The low enrolment estimate was discussed at the beginning of this section on non-university post-secondary education. The $5,863 figure is derived from the low ($2,800) operating cost figure for 1980, projected at 3 per cent.

(86) 42,202 x $8,375 = $353,441,750.

This figure derives from the low enrolment estimate and the high ($4,000) 1980 per student operating cost estimate projected at 3 per cent.

(87) 56,980 (medium enrolment estimate) x
$5,863 = $334,073,740.

This estimate is based on the medium enrolment estimate and the low per student cost estimate for 1980, projected at 3 per cent.

(88) 56,980 x $8,375 = $477,207,500.

This total is a product of the medium enrolment estimate and the high per student cost estimate for 1980, projected at 3 per cent.

(89) 70,337 (high enrolment estimate) x $5,863
= $412,285,831.

This figure derives from the high enrolment estimate and the low per student operating cost estimate for 1980 projected at 3 per cent.

(90) 70,337 x $8,375 = $589,072,375.

This estimate is based on the high enrolment estimate and the high per student operating cost estimate for 1980, projected at 3 per cent.

Capital Costs, 2005, at 3 Per Cent.

The two methods used to project capital costs of non-university post-secondary education to 2005 are the same as those used for the university sector. The first method is based on the assumption that capital costs will represent 25 per cent of operating costs; the second method, equally inelegant, is based on the assumption that capital costs will represent 50 per cent of operating costs:

(91) $247,430,326 x .25 = $61,857,582.

The $247,430,326 is the figure derived from the low enrolment, low per student cost estimate in equation (85).

(92) $353,441,750 x .50 = $176,720,875.

The $353,441,750 figure is derived in equation (86) from the low enrolment estimate and the high per student cost estimate.

(93) $334,073,740 x .25 = $83,518,435.

The $334,073,740 figure is based on the medium enrolment and the low per student cost estimate in equation (87).

(94) $477,207,500 x .50 = $238,603,750.

The $477,207,500 estimate is a product of the medium enrolment estimate and the high per student cost estimate in equation (88).

(95) $412,285,831 x .25 = $103,071,458.

The $412,285,375 figure is derived in equation (89) from the high enrolment estimate and the low per student cost estimate.

(96) $589,072,375 x .50 = $294,536,188.

The $589,072,375 is a product of the high enrolment estimate and the high per student cost estimate of equation (89). In the above calculations, equations (91), (93), and (95) use the low capital cost method; (92), (94), and (96) the high method.

Total Costs, 2005, at 3 Per Cent.

The following combinations of operating and capital cost estimates illustrate the range of total cost potentials:

(97) $247,430,326 — equation (85)
61,857,582 — equation (91)
$309,287,908

This total cost estimate is based on the lowest operating and capital cost estimates.

(98) $334,073,740 — equation (87)
83,518,435 — equation (93)
$417,592,175

This total cost figure is derived from the medium enrolment and low per student cost variables in determining operating costs and the low capital cost projection method.

(99) $589,072,375 — equation (90)
294,536,188 — equation (96)
$883,608,563

This total cost estimate is based on the high variables for estimating operating costs and the high method for determining capital cost estimates.

Operating Costs, 2005, at 5 Per Cent.

The previous estimates for operating, capital, and total costs for this educational sector were based on the assumption that increases in per student operating costs can be held to an annual rate of 3 per cent from 1980 to 2005. Since the 3 per cent estimate is probably too conservative, this section is devoted to the task of providing estimates based on the assumption that these per student costs will rise at a rate of 5 per cent per year from 1980 to 2005. The low per student cost estimate for 1980 ($2,800), projected at a 5 per cent rate, yields a figure of $9,482 operating cost per student by 2005. The high figure for 1980 ($4,000), projected at 5 per cent per year, gives a correspondingly higher $13,545.

(101) 42,202 x $13,545 = $571,626,090.
= $400,159,365.

This estimate is a product of the low enrolment estimate and the low per student operating cost estimate of 1980, projected at 5 per cent.

(101) 42,202 x $13,545 = $571,626,090.

This total derives from the low enrolment estimate and the high per student operating cost estimate of 1980, projected at 5 per cent.

(102) 56,980 x $9,482 = $540,284,360.

This figure is based on the medium enrolment estimate and the low per student operating cost estimate of 1980, projected at 5 per cent.

(103) 56,980 x $13,545 = $771,794,100.

This estimate is a product of the medium enrolment estimate and the high per student operating cost estimate of 1980, projected at 5 per cent.

(104) 70,337 x $9,482 = $666,935,434.

This total derives from the high enrolment estimate and the low per student operating cost estimate of 1980, projected at 5 per cent.

(105) 70,337 x $13,545 = $952,714,665.

This figure is based on the high enrolment estimate and the high per student operating cost estimate of 1980, projected at 5 per cent.

Capital Costs, 2005, at 5 Per Cent.

Capital costs in this section are estimated by the same method used previously, i.e., that they will represent 25 or 50 per cent of operating costs.

(106) $400,159,364 x .25 = $100,039,841.

The $400,159,364 as derived in equation (100) was a function of the low enrolment estimate and the low 1980 per student operating cost estimate, projected at 5 per cent.

(107) $571,626,090 x .50 = $285,813,045.

The $571,626,090 figure was derived in equation (101) from the low enrolment estimate and the high 1980 per student operating cost estimate, projected at 5 per cent.

(108) $540,284,360 x .25 = $135,071,090.

The $540,284,360 estimate was based in equation (102) on the medium enrolment estimate and the low 1980 per student operating cost estimate, projected at 5 per cent.

(109) $771,794,100 x .50 = $385,897,050.

The $771,794,100 as shown originally in equation (103) was a function of the medium enrolment estimate and the high 1980 per student operating cost estimate, projected at 5 per cent.

(110) $666,935,434 x .25 = $166,733,859.

The $666,935,434 figure from equation (104) resulted from a combination of a high enrolment estimate and a low 1980 per student operating cost estimate projected at 5 per cent.

(111) $952,714,665 x .50 = $476,357,333.

The $952,714,665 figure from equation (105) derives from the high enrolment estimates and the high 1980 per student operating cost estimate projected at 5 per cent. Equations (106), (108), and (110) use the low capital cost estimation method, while equations (107), (109), and (111) utilize the high method of estimating capital costs.

Total Costs, 2005, at 5 Per Cent.

The following four equations again are merely illustrative of the total cost solutions that can be derived from the various possible combinations of operating and capital costs:

(112) $400,159,364 — equation (100)
100,039,841 — equation (106)
$500,199,205

This potential total cost results from the lowest operating cost in combination with the lowest capital cost estimates.

(113) $540,284,360 — equation (102)
135,071,090 — equation (108)
$675,355,450

This total cost estimate results from a medium enrolment estimate and a low 1980 operating cost estimate, projected at 5 per cent, in relation to the low method for estimating capital costs.

(114) $ 952,714,665 — equation (105)
476,357,333 — equation (111)
$1,429,071,998

This is the total cost estimate based on the highest operating and capital cost combination.

(115) $540,284,360 — equation (102)
270,142,180
$810,426,540

This total cost estimate derives from the medium enrolment estimate with the low 1980 per student operating cost estimate, projected at 5 per cent, in combination with the high capital cost method of estimation.

Educational Costs in Relation to Personal Income

According to Professor Hanson's data, in 1968, the province was allocating about 14 per cent of its personal income to all forms of education.[1] The largest part, about half, was contributed by the provincial government; local governments contributed a smaller amount (about 5 of the 14) and the federal government and other sources, including student fees, the remainder.

For purposes of contrast, this section provides estimates of what an allocation of 12, 14, and 16 per cent of provincial personal income would yield for educational purposes. These revenue possibilities are then contrasted to specified cost estimates for 1980 and 2005.

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[1] Eric J. Hanson, **Financing Education in Alberta, op. cit.**

Educational Costs and Personal Income in 1980

In 1980, personal income, increasing at a projected rate in real terms of 5 per cent beyond 1970, with a 2.5 percentage point inflation factor, will total about $8,954,000,000. Calculating 12, 14, and 16 per cent of this personal income total yields:

at 12 per cent —	$1,074,480,000
at 14 per cent —	$1,253,560,000
at 16 per cent —	$1,432,640,000.

By way of contrast, assume the following educational costs:

Primary and secondary schools (equation 1)	$ 539,500,000
University, operating costs (equation 21)	$ 328,244,000
University, capital costs	$ 164,122,000
Post-secondary non-university operating costs (equation 71)	$ 77,280,000
Post-secondary non-university capital costs	$ 38,640,000
Total educational costs	$1,147,786,000

This total represents 12.8 per cent of projected personal income for 1980. The cost estimate for primary and secondary schools is based on a doubling of per student operating costs to $1,300 (including a debt service charge) between 1968 and 1980, an increase of just under 6 per cent per year per student. The university operating cost is based on the medium enrolment estimate in relation to the low operating cost estimate, which allowed for a doubling of operating costs per student, from $2,800 to $5,600, between 1968 and 1980. This also represents an increase of just under 6 per cent per student per year. The university capital cost estimate is based on the high method of capital cost projection, i.e., assuming capital costs represent 50 per cent of operating costs.

The non-university post-secondary sector cost estimate is based on medium enrolment estimates, the assumption that operating costs per student will amount to 50 per cent of operating costs per student in universities, that they will double from $1,400 to $2,800 during the period, and that capital costs will represent 50 per cent of operating costs.

The educational system envisioned by this cost estimate would require a smaller percentage of provincial personal income than education required in 1968. This being the case, it is feasible to ask how a kindergarten and pre-school system would affect the total cost estimates. As shown in equation (7), projected kindergarten costs in 1980 are $31,367,700. This amount added to the previous educational system cost would be $1,179,153,700, an amount equal to 13.2 per cent of provincial personal income as it is projected for 1980.

A pre-school system, based on the data built into equation (13), would cost another $65,674,700, and this amount added to the previous total, including kindergarten, would be $1,244,828,400. This last total represents 13.9 per cent of personal income, almost exactly the share of provincial personal income allocated to education in 1968.

Educational Costs and Personal Income in 2005

A somewhat different picture emerges from the relationship between projected costs and personal income in 2005. Projecting personal income at the 5 per cent real growth rate with a 2.5 per cent inflated personal income in 2005 would total $42,054,000,000. And:

12 per cent	$5,046,480,000
14 per cent	$5,887,560,000
16 per cent	$6,728,640,000

For 2005, assume the following educational costs:

Primary and secondary schools (equation 4)	$2,694,024,000
University, operating costs (equation 55)	$2,294,226,792
University, capital costs	$1,147,113,396
Post-secondary non-university, operating costs (equation 102)	$ 540,284,360
Post-secondary non-university, capital costs	$ 270,142,180
Total educational costs	$6,945,790,728

This estimate represents about 16.5 per cent of projected personal income for 2005. The cost estimate for primary and secondary schools is based on the single enrolment estimate and a 5 per cent per year per student increase in operating costs, from $1,300 in 1980 to $4,402 in 2005.

The university operating cost estimate is based on the medium enrolment estimate and an increase of 5 per cent per year in per student costs, from $5,600 in 1980 to $18,964 in 2005. The university capital cost estimate follows the high projection assumption that capital costs will represent 50 per cent of operating costs.

The non-university post-secondary operating cost estimate is also based on medium enrolment projections and an increase of 5 per cent per year in per student costs, from $2,800 in 1980 to $9,482 in 2005. The capital cost estimate is based on the 50 per cent of operating costs assumption.

While the educational system thus projected would require 16.5 per cent of provincial personal income, a kindergarten activity costing $238,883,334 (equation 10) would bring total costs to $7,171,468,062 or 17.1 per cent of personal income. Adding pre-school costs of $488,639,608 (equation 16) brings the total cost to $7,660,107,670 or 18.2 per cent of projected personal income.

What has happened between 1980 and 2005 to inflate costs as a percentage of personal income is accounted for largely by the university sector of education. In 1980, according to the cost estimates used in this section, universities account for 42.9 per cent of total educational costs, non-university post-secondary education for 10.1 per cent, and primary and secondary schools for 47 per cent. By 2005, according to this set of cost estimates, university costs represent 49.6 per cent of the total (up from 42.9), non-university post-secondary 11.7 per cent of the total (up from 10.1), and primary and secondary schools 38.7 per cent (down from 47 per cent).

Thus, it would appear that it is the university cost structure that will have to be controlled if educational costs are to remain about 14 per cent of personal income. This, however, is not a necessary condition of 2005 and will be determined by how much importance the community attaches to the education function. Moreover, increased university shares of total educational costs assume increasing participation rates at the university level. If this comes to pass, it will be difficult to expect universities and non-university post-secondary institutions to operate within the budget constraints of lower participation rates. If Alberta elects to educate a significantly larger share of its 18-24 and over age groups than it has done in the past, then this decision will probably require an increase in personal income shares devoted to education. This difficulty strikes with particular force because of the large per student costs of post-secondary education compared to primary and secondary school costs per student.

Nonetheless, a question may arise: will it really be necessary to spend about $1,147,113,396 for capital expenditures at universities in 2005? If the province assumes that a 5 per cent increase in annual per student costs is reasonable on the operating side of the budget, economies may occur in the capital budget.[1] For example, if capital costs were held to 25 per cent rather than 50 per cent of operating costs in 2005, total costs would be lowered by $573,556,698, and the educational system would account for 15.1 per cent of personal income, without a kindergarten and pre-school system. On the other hand, attention is called to the fact that in recent years capital costs have been averaged much more than 50 per cent of operating costs.

Provincial Government Revenues

With these cost and personal income relationships in hand, the question of provincial government revenues as they are expected to grow by 1980 and 2005 comes next to mind.

The context within which the provincial government will look to the task of funding the Alberta education system must recognize the increasing responsibility to be assumed by provincial governments and the federal government during the coming years. Although this responsibility goes beyond the field of education, it has been increasingly noticeable in education.

This increased responsibility, in turn, can be traced to the inability of local governments to adequately fund public sector activities. Although there are many reasons for these changing intergovernmental fiscal relationships, the primary reason for local government difficulties on the revenue side is the fact that almost all local governments have tied themselves to a tax base — primarily property taxes — which is essentially regressive. This regressivity creates serious equity problems which are beyond the scope of this discussion, but which also create problems of revenue flows that are pertinent here. A regressive tax system, by definition, will not increase proportionately with income and the demand for public services. Thus, local governments find that their revenues do not keep up with changes in the level of income and resultant higher demands for public services. This is a problem at all levels of local government — small and large, urban and rural — and has threatened a serious breakdown in the quality of public services. In education, for example, it threatens the development of adequate public school systems. In an effort to alleviate this problem, senior levels of government have stepped in to fill the void. At the provincial level, this intervention usually takes the form of an educational foundation system, which finds the provincial government assuming an increasingly larger part of the costs of primary and secondary education.

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[1] The 5 per cent increase in annual per student operating costs is predicated on the price inflator used for this study. The price inflator is 2.5 percentage points, which works out to about a 1.5 per cent increase over the 35-year period from 1970 to 2005. If the rate of inflation is greater, then presumably the increase in per student operating costs will be greater. If it is less, the increment in costs can be less. Note that this 5 per cent factor in relation to a price inflation of 1.5 per cent allows for a growth relationship greater than 2-1.

Happily, the regressiveness of local tax systems are not found, at least in the same degree, at higher levels of government. Alberta, with personal income taxes and mineral activity receipts as the backbone of its revenue system, can look forward to continued growth of income to the provincial government.

By way of background, provincial government revenues as reported by the Dominion Bureau of Statistics totalled about $813 million in 1968.[1] This represented about 20.1 per cent of provincial personal income that year. As can be seen in Table IV-1, provided by the provincial Department of the Treasury, provincial government revenues in 1980 are expected to total $2,081,734,000, about 23.1 per cent of projected provincial personal income in that year.[2] This gain of 3 percentage points in provincial government revenues as a percentage of provincial personal income presumably is some reflection of the progressivity of the tax and revenue system used by provincial government. A characteristic of such a system will be an increase in revenues greater than that in income.

In 1968, the provincial government allocated about 35 per cent ($285 million) of its $813 million in revenues to education. By 1980, if the provincial government again allocates 35 per cent of its projected revenues to education, an amount equal to $728,606,900 will be forthcoming. This is considerably more than would be allocated to education if the provincial government were to allocate a constant 7 per cent of personal income in the province to education. The amount in the latter case would be $626,780,000. Thus, allocating 35 per cent of provincial government revenues to education will represent a little more than 8 per cent of provincial personal income in 1980.

What is likely to happen between now and 1980 is that the provincial government will continue to increase its share of total education spending. That is, if its contribution to education increases from about 7 to about 8 per cent of provincial personal income, assuming a continued 35 per cent allocation of provincial government revenues to education, local government contributions are likely to fall below 5 per cent of provincial personal income. Thus, there will be a tendency to substitute partially the more progressive provincial government revenue structure for the more regressive local government structure, to meet increased expenditure requirements for education.

To summarize, by 1980, if the provincial government were allocating 8 per cent of provincial personal income to education, up from about 7 per cent in 1968, and if local government were allocating about 4 per cent of provincial income to education, down from about 5 per cent in 1968, then:

Provincial government	$ 728,606,900
(35 per cent of provincial government revenues)	
Local government	$ 358,160,000
	$1,086,766,900

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[1] Dominion Bureau of Statistics, **Provincial Government Finance,** 1968.

[2] These estimates are based upon growth projections supplied by the author. Table IV-2 shows projected revenue in constant (1957) dollars.

[1] Of the more than $2 billion in provincial government revenues projected for 1980, more than $651 million would come from oil and gas revenues, and $497 million from personal income taxes. These are the most important sources of provincial government revenue projected for 1980, accounting for more than half the total.

In this event, to meet the total costs postulated in the previous section, the federal government and miscellaneous sources would need to supply $61,019,100 if no kindergarten or pre-school costs were incurred, $92,386,800 with kindergarten costs added to the above total, and $158,061,500 if pre-school as well as kindergarten costs were added.

The general impression that derives from these data is that between now and 1980 Alberta may well be able to avert a financial crisis in education, if cost figures are held to the range discussed in the previous section.

There may be widespread feeling, however, that these cost estimates are too conservative. For example, Professors Hanson and Atherton in their position paper for the Commission on Educational Planning suggest that total educational costs in 1980 will probably range between $1.5 billion and $2 billion. This introduces the final point in the discussion of 1980 revenues in relation to costs. To prevent a financial crisis in education, two and possibly three elements of finance are necessary. The first is a continuation of federal grants to education as they have developed since 1967. In that year, the federal government began making large cost-sharing grants to the provinces based on a payment of $15 per capita or 50 per cent of approved operating costs of post-secondary education, whichever is larger. It is vital to the province that this source of funding be maintained and, hopefully, increased.[1]

Second, the importance of oil and gas revenues to the province is vital and needs to be adequately recognized. A revenue source of $651 million speaks for itself in relation to provincial policy.

Third, financial problems may give rise to some alteration in the form of provincial taxes. Accordingly, the Alberta Department of the Treasury has projected revenue levels to 1980 and 2005, not only on the assumption of a constant tax structure, but on various assumptions provided by the author with regard to possible changes in the tax system. Table IV-4, for example, shows how an increase of 1 per cent in the personal income tax rate in 1971, 1976, and 1980 would influence the flow of personal income taxation by 1980. In short, personal income tax receipts would be increased by about $45 million by 1980. Alternatively, Table IV-5 shows the impact of a general retail sales tax, food and drugs exempted, on provincial revenue flows. In 1980, this tax would represent incremental revenue of nearly $278 million. Finally, Table IV-6 shows the net effect of the personal income tax increase and the sales tax increase, which would bring 1980 revenues to $2,404,734,000 in that year.

The inclusion of these estimates in no way suggests their desirability to meet expenditure needs in 1980. What they do show, perhaps, is an equitable way to increase provincial government taxes, should that become necessary.

A final revenue item, which will be discussed in more detail in the final section of this chapter, relates to the possibility of using student fees as an additional source of revenue to finance higher education and the financial arrangements this implies with regard to loan funds.

Revenue Sources in 2005

The cost estimate used for illustrative purposes earlier in this chapter would impose a larger burden in relation to personal income in 2005 than Alberta has historically allocated to education. These figures were 16.5 without kindergarten or pre-school, 17.1 with kindergarten, and 18.2 with both kindergarten and pre-school.

A further problem in 2005 that may be identified from Table IV-2 is that projected revenues of the provincial government in 2005 will represent only 21.3 per cent of projected personal income. In 1980, the projected figures produced a 23.1 relationship.

Thus, if the provincial government chooses to allocate the 8 per cent of provincial personal income to education postulated for 1980, this would require an allocation of 37.6 per cent of its total revenues to education rather than the 35 per cent allocated in 1968 and assumed for 1980. The following data show these figures for provincial and local governments for 2005:

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[1] Table IV-3 shows the growth in total federal grants to Alberta from 1958 to 1968. According to the Alberta Department of the Treasury, federal grants for education totalled nearly $35 million in 1968-69, about $40 million in 1969-70, and are expected to rise to nearly $57 million in 1970-71.

Provincial government (8 per cent of personal income: 37.6 per cent of revenues)	$3,364,320,000
Local governments (4 per cent of personal income)	$1,682,160,000
	$5,046,480,000

Assuming the previously used $6,932,584,728 cost figure without kindergarten and pre-school, there is a revenue gap in 2005 of $1,886,104,728. In 1968, the federal government, according to Professor Hanson's data, supplied funds for education equal to about 8 per cent of the costs incurred by provincial and local governments. In 2005 this would amount to about $403,718,400. In addition, miscellaneous sources supplied about 4 per cent; in 2005, this would amount to about $201,859,600. Given these additional sources of funds, there would still be a revenue gap, without kindergarten or pre-school programs, of $1,280,527,128.

Table IV-5 shows that this gap would yield to a 5 per cent general retail sales tax, food and drugs exempted, which would produce about $1,303,679,000 in 2005. This requires the assumption, however, that the entire amount of sales tax would be allocated to education expenditures by the provincial government.

The revenue gap of 2005 would not be filled by the postulated increase in personal income taxes, assumed to have increased by five points by 1990 and beyond, since this would bring incremental revenues of $637,056,000 (see Table IV-4). The increase in revenue in 2005 with both tax increases would amount to $1,940,735,000 (see Table IV-6).

An alternative to these changing tax sources, given the postulated cost structure, is the potential contribution of the federal government to post-secondary educational expenditures. If, in 2005, the federal government were to meet 50 per cent of the operating expenditures of post-secondary education, a sum of $1,417,255,576 would be forthcoming to help finance total education costs. This is an indication of the stake provincial and local governments, as well as concerned citizens, have in the role the federal government will play in financing education.

Should such a revenue source become available from the federal government, the revenue gap of $1,886,104,728 ($6,932,584,728 - $5,046,480,000) would be reduced to $468,849,152. This remaining gap could be filled, in turn, by increasing the percentage contributions of provincial and/or local governments or by student fees or by other sources.

The question of student fees warrants additional comment. There may be a growing feeling among policy makers as well as taxpayers that the direct beneficiaries of post-secondary education, i.e., the students, should begin to meet a larger share of their educational expenses. This does not suggest that all the benefits of education accrue to the direct recipients. It does suggest, however, that a significant part of the benefit accrues to participants and that it may be reasonable to expect them to pay a larger share of costs out of the increase in future earnings that education makes possible.

Table IV-7, for example, shows the standardized life-time earnings for selected professional occupations for 1956 and 1966. What is particularly interesting about these data is the increase in earning power that appears to be some function of graduate training necessary to gain access to certain occupational groups.

Moreover, it is well known that the cost of training specialized groups, e.g., medical students, is many times greater than the costs associated with undergraduate and even other graduate students.

Thus, as the costs of post-secondary education become the largest part of total educational spending, the community will quite naturally think of student fees as a means of financing a larger part of the burden.

Should this become common practice, one more **caveat** is in order. Substantial increases in student fees will create even greater barriers to post-secondary education for low and middle income groups than already exist. The province can minimize the risk of this economic discrimination, however, by providing a loan fund to students to cover the costs of post-secondary education. Money borrowed from this fund would be repaid from the future earnings of students, and could possibly involve a withholding system similar to tax withholding. The size of the fund would grow over time as student population increased, but when revenues into the fund had been established from student earnings, the gap should not create serious financial problems for the province. Whatever problems occurred would probably be less serious than exclusion of certain income groups from post-secondary education.

The Vulnerability of Long-Term Projections

This chapter, like all the chapters before it, has attempted to bring together some data projections which can assist the persons who will determine educational policy in the province during the course of the next 35 years. In this chapter specific configurations of data, particularly relating to costs, revenues, and income have been developed and may afford a useful context for policy discussions. That none of the projections made here will occur is a conclusion so obvious that it can be dismissed without further comment. What does require further comment is the requirement that the nature of the problems discussed here, and the data projections which provide their frame of reference, be subject to continuing and critical analysis.

Part of this analysis, i.e., the development of an operational theory of public spending, can make a significant contribution to maximizing the benefits of funded educational programs if it is cognizant of recent developments in systems analysis of public programs. It is with this analysis that the final section of this chapter is concerned.

Systems Analysis of Public Spending — The Planning, Programming, Budgeting System

The Commission on Educational Planning, and other commissions concerned with the nature and scope of public policy, will necessarily make recommendations and proposals relating to the expenditure of funds and the allocation of resources for public purposes.

While this study has been primarily concerned with projecting population, enrolment, economic activity, cost, and revenue variables as they relate to educational problems and potentials, the context within which educational plans and programs are made also requires brief mention.

The history of public finance in North America and Western Europe has been devoted to a considerable extent to the analysis of revenue systems for satisfying spending requirements of public sectors. This development of the theory of taxation, for the most part, has not been accompanied by an equally elegant theory of expenditure.

In the absence of a general theory of public spending which provides useful guidelines to the level and composition of government budgets, public expenditures have developed within a pragmatic context of incremental budgeting systems. This budgeting system has developed largely as a separate area of analysis from the planning and management functions of government, with only fortuitous attempts to integrate the three functional activities.

The difficulties that have inevitably grown out of incremental budgeting have given rise over the course of this century to a series of reforms designed to ameliorate the most glaring inefficiencies of the system. Thus, in the first third of the century, various attempts were made in various countries to reform the budgeting system in an attempt to develop more stringent systems of financial control. The objective of this reform was to bring the spending activities of public officials, particularly in administrative agencies, more closely under the control of policy makers — i.e., to minimize corruption in the use of public funds and to insure that public spending was in the amount and for the purposes designed by these policy makers.[1]

The second stage of budgetary reform was a conscious attempt at managerial improvements in the public sector, designed for the most part to improve the relationship between inputs and outputs in government activities. This managerial stage of budget reform took the name of performance budgeting, being particularly concerned with maximizing the outputs of government programs with specified input levels.

The current stage of budget reform in Canada and the United States takes the name of program budgeting, a short title for planning-programming-budgeting systems. Program budgeting, a form of systems analysis, looks toward vast changes in the operation of the public sector in the sense that it seeks to integrate the planning-budgeting-management functions into a systems design. In other words, instead of treating planning activities such as determining broad policy objectives as a problem separate from the budgets designed to accomplish those objectives, PPBS requires a unified approach to public spending, planning, and management. For example, under a PPB system, management of public agencies must re-orient its thinking about the input-output relationships perfected or improved under performance budgeting. Management and evaluation of public programs must be specified, not only in terms of input-output relationships, but in terms of how program outputs are related to carefully specified program objectives. It is in the careful, and arduous, identification of program objectives that the planning and budgeting activities are brought into a unified system.

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[1] For a discussion of the stages of budget reform, see Allen Schick, "The Road to PPB: The Stages of Budget Reform," **Public Administration Review,** 26:4 (December 1966).

Another way of looking at the prospects of PPBS is to consider its elements, or component parts. PPBS, in a basic sense, can be looked upon as comprising three inter-related processes. The first element or process relates to the determination of program objectives. This element, surprisingly enough, is often absent from statements of public policy, at least in the sense of providing operational guidelines to program design.

The second element of PPBS is often referred to as program analysis, by which is meant the conscious attempt to design alternative programs for the accomplishment of specified objectives. Alternative program design encompasses many of the techniques that were introduced in performance budgeting, such as benefit-cost analysis. The major difference is that program analysis under PPBS requires that program design always be related back to the program objectives previously specified or now being specified in the work of a budgeting process.

The third major element of PPBS is referred to as program evaluation, and completes the integration of planning, budgeting, and management activities. It requires an evaluation of existing and proposed programs in relation not only to input-output relationships but in relation to outputs and program objectives. Accordingly, it requires in many cases a new information system that goes beyond the input-output information typically included in the budget statements and justifications of public programs.

While this is a very sketchy outline of the composition of PPBS, hopefully it will serve to help maintain the interest of provincial policy makers in the design of improved budget systems.[1] The promise of PPBS, of course, lies in its potential for improved program performance, and this must have particular application to education. It is possible, and even probable, that it is in public sector educational processes that some of the major payoffs of PPBS are most likely, given the size of educational budgets, the incremental processes that have determined resources allocation to this activity, and increased demands for more cost effective programs in education.

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[1] For a concise and stimulating discussion of the goals and elements of PPBS, see Charles Schultze, **The Politics and Economics of Public Spending,** Washington, D.C.: The Brookings Institution, 1968.

TABLES, CHAPTER IV

TABLE IV-1

PROJECTED PROVINCIAL GOVERNMENT NET GENERAL REVENUE IN CURRENT DOLLARS, 1971 - 2005

(thousands of dollars)

	Personal Income Tax	Corporate Income Tax	Motor Fuel Tax	Motor Vehicle Revenue	Alberta Beverage Profits	Oil and Natural Gas Royalties	Tobacco Tax	Oil and Natural Gas Bonus Revenue	Other Oil and Natural Gas Revenues	Other Taxes	Other Revenues	Total
1971	223,373	89,516	115,231	39,754	72,697	178,893	15,707	85,068	94,659	44,897	196,546	1,156,340
1975	319,605	114,432	151,086	53,491	94,615	246,446	18,476	110,707	120,988	60,494	228,417	1,518,756
1980	497,258	154,555	201,067	71,868	125,163	341,250	22,287	153,264	157,463	82,365	275,196	2,081,734
1985	768,906	207,408	256,476	91,698	161,646	447,354	26,448	210,714	198,186	106,836	330,252	2,805,923
1990	1,182,969	277,139	317,796	112,460	209,813	565,095	30,959	288,143	242,823	133,720	384,003	3,744,919
1995	1,812,491	368,349	384,866	135,320	266,859	694,112	35,820	392,428	291,535	163,379	444,168	4,989,377
2000	2,765,363	487,931	457,898	158,837	335,439	834,791	41,031	532,346	344,322	195,638	508,869	6,662,460
2005	4,204,479	644,000	527,520	183,232	415,968	986,720	46,592	719,488	401,408	230,496	577,696	8,937,599

Source: Revenue estimates were provided by the Bureau of the Budget, Alberta Provincial Government, on the basis of estimated economic growth variables provided by the author. Revenue data in this table are based on a real growth rate in Gross Provincial Product and Personal Income of 5 per cent per year plus a price inflator of 2.5 percentage points per year, and no change in the tax system. The Bureau of the Budget estimates for tobacco revenue, motor fuel tax, and motor vehicle revenues are based on population levels rather than income levels. Although these estimates are based on population projections of Alberta Bureau of Statistics population series, the resultant conservative bias is probably insignificant. The 2005 population total estimated from Alberta Bureau of Statistics projections is less than 100,000 under the Oil & Gas Conservation Board projection.

TABLE IV-2

PROJECTED PROVINCIAL GOVERNMENT NET GENERAL REVENUE IN CONSTANT (1957) DOLLARS, 1971 - 2005

(thousands of dollars)

	Personal Income Tax	Corporate Income Tax	Motor Fuel Tax	Motor Vehicle Revenue	Alberta Beverage Profits	Oil and Natural Gas Royalties	Tobacco Tax	Oil and Natural Gas Bonus Revenue	Other Oil and Natural Gas Revenues	Other Taxes	Other Revenues	Total
1971	160,700	64,400	82,900	28,600	52,300	128,700	11,300	61,200	68,100	32,300	141,400	831,900
1975	214,500	76,800	101,400	35,900	63,500	165,400	12,400	74,300	81,200	40,600	153,300	1,019,300
1980	307,900	95,700	124,500	44,500	77,500	211,300	13,800	94,900	97,500	51,000	170,400	1,289,000
1985	441,900	119,200	147,400	52,700	92,900	257,100	15,200	121,100	113,900	61,400	189,800	1,612,600
1990	634,300	148,600	170,400	60,300	112,500	303,000	16,600	154,500	130,200	71,700	205,900	2,008,000
1995	910,800	185,100	193,400	68,000	134,100	348,800	18,000	197,200	146,500	82,100	223,300	2,507,200
2000	1,307,500	230,700	216,500	75,100	158,600	394,700	19,400	251,700	162,800	92,500	240,600	3,150,100
2005	1,877,000	287,500	235,500	81,800	185,700	440,500	20,800	321,200	179,200	102,900	257,900	3,990,000

Source: **Ibid.**

TABLE IV-3

CONDITIONAL AND UNCONDITIONAL TRANSFERS FROM THE GOVERNMENT OF CANADA TO THE GOVERNMENT OF THE PROVINCE OF ALBERTA, 1958 - 1967

(thousands of dollars)

	1958-59	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68
Unconditional Transfers										
1. Tax-sharing arrangements	46,341	55,370	57,146	58,386	—	—	—	—	—	—
2. Federal-Provincial fiscal arrangements	—	—	—	—	14,218	10,452	9,592	6,008	4,640	8,364
3. Statutory subsidies	2,274	2,400	2,358	2,816	2,816	2,852	2,898	2,887	2,887	2,955
4. Share of income tax on power utilities	2,216	1,239	1,449	1,754	2,763	2,742	2,907	2,569	2,932	2,886
Conditional Transfers										
5. Transport and Communications	3,005	2,566	1,801	2,516	1,463	1,460	630	443	1,385	917
6. Health and Social Welfare	15,297	23,941	25,175	29,320	38,351	45,174	50,115	57,479	66,041	85,228
7. Recreation and Cultural Services	104	226	258	271	165	13	52	186	2,962	159
8. Education	1,638	934	898	2,059	20,608	20,207	7,632	15,316	23,104	31,119
9. Natural Resources & Primary Industries	350	964	2,132	1,399	788	1,956	1,504	1,352	2,440	1,204
10. Winter Works Projects in Municipalities	—	1,069	1,545	2,532	2,952	2,971	2,479	(included in Item 6)		
11. Miscellaneous Transfers	260	252	256	401	391	584	643	650	566	1,506
Total Unconditional Transfers	50,831	59,009	60,953	62,956	19,797	16,046	15,397	11,464	10,459	14,205
Total Conditional Transfers	20,654	29,952	32,065	38,498	64,718	72,365	63,055	75,426	96,498	120,133
Total Transfers from Government of Canada	71,485	88,961	93,018	101,454	84,515	88,411	78,452	86,890	106,957	134,338

Source: Dominion Bureau of Statistics, **Provincial Government Finance: Revenues and Expenditures**, 1967 and 1969.

TABLE IV-4

CHANGES IN PROJECTED PROVINCIAL GOVERNMENT NET GENERAL REVENUE IN CURRENT DOLLARS, 1971 - 2005, WITH 1 PER CENT INCREASE IN PERSONAL INCOME TAX RATE EVERY FIVE YEARS, 1970-1990

(thousands of dollars)

	Adjusted Personal Income Tax	Adjusted Total
1971	230,184	1,163,151
1975	338,975	1,538,120
1980	542,478	2,126,954
1985	861,996	2,899,013
1990	1,362,195	3,924,146
1995	2,087,112	5,263,947
2000	3,184,344	7,081,442
2005	4,841,535	9,574,655

Source: Department of the Treasury, Government of Alberta.

TABLE IV-5

CHANGES IN PROJECTED PROVINCIAL GOVERNMENT NET GENERAL REVENUE IN CURRENT DOLLARS, 1971 - 2005 WITH 5 PER CENT GENERAL RETAIL TAX (FOOD AND DRUGS EXEMPTED)

(thousands of dollars)

	Sales Tax	Adjusted Total
1971	154,290	1,310,630
1975	201,150	1,719,906
1980	277,780	2,359,514
1985	381,060	3,186,983
1990	522,200	4,267,119
1995	710,430	5,699,757
2000	964,440	7,626,900
2005	1,303,679	10,241,278

Source: Department of the Treasury, Government of Alberta.

TABLE IV-6

CHANGES IN PROJECTED PROVINCIAL GOVERNMENT NET GENERAL REVENUE IN CURRENT DOLLARS, 1971-2005, WITH CHANGES IN PERSONAL INCOME AND SALES TAX

(thousands of dollars)

	Personal Income Tax	Sales Tax	Adjusted Total
1971	230,184	154,290	1,317,441
1975	338,975	201,150	1,739,276
1980	542,478	277,780	2,404,734
1985	861,996	381,060	3,280,073
1990	1,362,195	522,200	4,446,345
1995	2,087,112	710,430	5,974,377
2000	3,184,344	964,440	8,045,882
2005	4,841,535	1,303,679	10,878,334

Source: Department of the Treasury, Government of Alberta.

TABLE IV-7

STANDARDIZED LIFE-TIME EARNINGS OF CERTAIN PROFESSIONAL MANPOWER, CANADA, 1956 AND 1966

Educational Level	Standardized Life-Time Earnings	
	1956	1966
1. B.A.		
Arts	$160,091	$244,615
Science	190,860	268,384
Engineering	191,928	303,435
Agriculture	162,153	247,417
2. M.A.		
Arts	$189,845	$272,804
Science	271,577	339,384
Engineering	306,374	353,183
Agriculture	214,756	304,746
3. Ph.D.		
Arts	$244,583	$337,735
Science	322,615	418,600
Engineering	313,247	429,459
Agriculture	260,866	371,950
4. Professional Degrees		
Architecture	$409,126	$636,740
Dentistry	355,880	499,032
Law	372,204	629,857
Medicine		
(a) General Practice	380,705	680,530
(b) Medical Specialty	458,018	875,847
(c) Surgical Specialty	521,120	1,001,829

Source: Table 3 from **Health Services**, Volume 3 of the **Task Force Reports on the Cost of Health Services in Canada**. Published under the authority of the Honourable John C. Munro, PC, MP, Minister of National Health and Welfare (in Ontario Commission on Post-Secondary Education, **Post Secondary Education in Ontario: A Statement of Issues**, p. 5).

CHAPTER FIVE

SOME BASIC ISSUES OF EDUCATIONAL POLICY

The principal objective of this chapter is to summarize some of the major policy issues that derive from the economic and demographic variables discussed in the previous chapters.

Population Change and Educational Policy

Unless all available indicators of population change in the province are drastically revised, Alberta must look forward to continued growth in the demand for all levels of educational services. As the provincial population approximately doubles between 1970 and 2005, the absolute increase in the size of the under-24 age group will provide vexatious problems for policy makers charged with the responsibility of providing educational opportunities from pre-school through post-secondary education. The problems will be only slightly lessened by the fact that the under-24 age group will constitute a declining percentage of the total population.

Within the context of provincial growth will occur the difficult problem of rapidly expanding metropolitan centres and concurrent decline in most rural areas. At the pre-school through post-secondary level, these changes in geographic distribution of the population will increase the pressure toward centralization and reorganization of school facilities, as serious diseconomies force up the cost structure of schools in declining areas. Simultaneously, as rural communities continue to lose economic opportunity, the decline in their ability to meet educational costs will put additional pressure on the provincial government to increase its share of costs through equalization foundation systems. In fact, regressiveness of municipal revenue sources — rural and urban — will constitute additional pressure for the provincial government to finance an increasing share of pre-school through secondary educational costs.

At the post-secondary level, the concentration of population in the Edmonton and Calgary Regions and in other selected cities in the province will tend to simplify the problem of location of post-secondary facilities. Provincial policy as it has developed throughout the 1960's has been to place the post-secondary facilities in the growing population centres. This has meant, for the most part, that provincial costs and total costs have been minimized by providing few residence facilities on post-secondary campuses. In other words, the social overhead cost of living facilities has been borne largely by the family and no duplicatory facilities have added to provincial costs.

If the province were to try to reverse the flow of population to established metropolitan areas by building post-secondary educational facilities outside population centers, provincial costs and total costs of post-secondary education would accelerate sharply as massive construction programs for residence halls became necessary. Attendant costs, such as loss of part-time job opportunities for students in metropolitan centers, would add to the total costs of a change in the spatial location policy of post-secondary facilities.

The needs of special students in pre-school, primary, and secondary education will require considerable attention in the years to come. Is the province doing enough, for example, for students who are mildly or severely retarded; for students who suffer from some form of emotional disturbance; for students with physical impairments relating to seeing, hearing, and speaking that stand in the way of satisfactory accomplishment in school? While the province has introduced limited programs for the needs of special students, the data suggest that further allocations and refinements are required.

Enrolment Levels and Educational Policy

Different growth and stability patterns within provincial population during the next 35 years have interesting implications for educational policy in Alberta. For example, between 1970 and 1980, the growth in enrolment at the 1-12 level will cease as the 6-17 age group stabilizes in size. This means that for the first time in 20 years primary and secondary schools will have a respite from constantly growing numbers of students, although this will obviously not be true for every school district in the province. From the point of view of educational systems, this hiatus in growth in the number of students will permit systematic review of progress and problems before the population characteristics of the post-1980 period usher in another period of continuous growth in 1-12 enrolment.

From the point of view of educational finance, the stability in enrolment from 1970 to 1980 will allow a tentative concern with capital plant improvement rather than excessive concentration on capital plant expansion. And from the point of view of educational quality, the stability in enrolment will represent an opportunity for school systems to concentrate on improving the abilities of teaching personnel as teacher supply conditions become better aligned with relatively stable demand conditions.

One of the important issues that will be raised with increasing urgency, particularly in view of enrolment stability at the 1-12 level, will relate to the creation of publicly supported kindergarten and pre-school facilities. Given the suggestions in learning theory concerning the ability of children to learn long before they reach the first grade, and given the fact that Alberta alone among the provinces has not formulated a general plan for public pre-school programs, public concern for innovative programs is quite likely to grow.

Relative stability in post-secondary enrolment will occur during the 1980's and will allow the province to evaluate the many problems generated by burgeoning enrolment between 1960 and 1980. Moreover, the province must plan for the expected increase in post-secondary enrolment after 1990.

Among the policy issues that will command attention will be the relationship between university and non-university enrolment at the post-secondary level. Should the province seek a closer tie between universities and colleges in the sense of allowing more college responsibility for the first two years of post-secondary education? If so, should universities look toward specialization at the third and fourth year of undergraduate education and in the sphere of graduate study? If so, what should be the provincial attitude toward non-resident graduate students?

Alternatively, should community colleges, institutes of technology, etc., be geared to vocational rather than pre-professional training, and should the province attach greater emphasis thereby to vocational education?

One of the profound concerns of post-secondary education will relate to access by economically and socially underprivileged groups to vocational and professional opportunity which only education beyond the high school can provide. Low income groups, minority groups, and relatively isolated groups from rural areas will demand more meaningful access to the province's vocational and professional educational structure as a prerequisite to entrance into the mainstream of economic life.

Economic Growth and Educational Policy

Analysis of the basic determinants of economic growth in Alberta suggest that the 5.5 per cent real growth rate in gross product and personal income of the last twenty years is not beyond the capacity of the province to sustain during the forecast period.

The ability of the provincial economy to continue along this growth path will be determined by its continued propensity to utilize the comparative advantage of its resource base for sale of products outside Alberta. The basic growth potential of the province will continue to depend heavily on the export of petroleum and natural gas, other mineral resources, agricultural output, tourist services, and the set of manufacturing activities that has grown up around these economic sectors. The resource base — petroleum, natural gas, coal, productive agricultural lands, water, forests, scenic values, etc. — seems to be capable of continued growth, assuming that land use and resource planning is conducted within a combined context of economic and ecological concern.

The principal issues that will determine the ability of the economy to meet the needs of expanded and improved educational programs concern the continued exploration, development, and recovery of energy fuel sources in relation to export demands. An attendant question will relate to the social and political demands for domestic ownership of provincial firms and resources and the implications of ownership change for economic growth.

Cost and Revenue Constraints on Educational Policy

During the 1960's, the rapid growth of all forms of education in the province required a significant increase in the percentage of provincial personal income devoted to educational services. By the end of the decade about 14 per cent of provincial personal income was allocated to meeting the costs of education. The search for an appropriate allocation of the province's income and product to all forms and levels of education will represent a major policy issue of the next decade and beyond.

There are many corollary questions that must be answered before an appropriate share of income to be allocated to education can be determined. One of the vital issues will relate to the rate of cost increase per student necessary to maintain and/or improve educational quality. Between the present time and 1980, there is some evidence that if the rate of increase in operating costs per student is held to about 6 per cent for all levels of education, the province will be able to meet educational costs without significant tax increases. This ability will also be determined by the level of capital expenditures, particularly at the post-secondary level.

Will the province be able to fund public programs in kindergarten and pre-school without an increase in the education revenue base? One of the difficult questions that must be resolved in the coming decade will be the trade-offs involved in the various levels of education. Should Alberta deliberately hold to a 6 per cent rate of increase in operating costs per student at the Grades 1-2 levels in order to initiate kindergarten and pre-school programs? Or should the necessary quality variables be insured within the existing grade structure before initiation of kindergarten and pre-school programs?

A closely related policy issue concerns other kinds of innovative programs for primary and secondary students. What is the priority ranking between kindergarten and pre-school programs and programs that seek to offer special opportunities for special students, for example for the mildly and severely retarded and/or emotionally disturbed students? Can the province afford to move simultaneously into kindergarten, pre-school, and special programs? In the final analysis, the last question relates to the value structure the province applies to questions of public needs and private wants.

Difficult issues also surface in contemplating post-secondary education within the next decade and beyond. One of these issues relates to the rapid increase in costs at the post-secondary level that has occurred in recent years. Will the province be willing to continue this rate of increase or is it already insisting upon a more cost-effective check on, say, university spending? An obvious corollary to this issue is a question: can the province expect to educate a significantly larger share of the 18-24 age group and beyond without allocating a significantly larger share of provincial personal income to post-secondary institutions?

At the post-secondary education level there is a significant difference between the costs of university and non-university institutions. Can the province achieve sizable economies by using the college system more extensively for the first two years of post-secondary education and using the universities exclusively for advanced undergraduate and graduate students? Or would this allocation compromise the quality variables the province is seeking in post-secondary education?

Always in the background of any discussion of costs and revenues is the search for alternative sources of funds. Internally to the province, several sources of incremental revenues are available. An increase in the personal income tax or the imposition of a general sales tax to be used for education are two obvious alternatives. The income tax has the advantage of offering a more equitable burden among income groups than does the sales tax, although the sales tax can be greatly improved and made roughly proportionate to income if food and drugs are not taxed.

Any suggestion that income or sales taxes be devoted to education immediately raises another fundamental question about the relative value to Albertans of educational and other kinds of public services. What is the value of increased educational facilities compared to improved physical and mental health facilities? The question is a general one, relating to all the activities provided by local, provincial, and federal governments.

Another potential form of increased revenues from internal sources grows out of the contention that the increased earnings associated with post-secondary education justifies significantly larger student fees. Students at the post-secondary level pay a small part of the total costs of their education. This has naturally given rise to a suggestion that they pay a larger share of their costs. Given the size projections of post-secondary enrolment, there is little doubt that increased student fees could be a significant source of provincial revenues. A related issue, if this alternative becomes attractive, is how to realize the revenue source without compromising educational opportunities of students from low and middle income families. Will a provincial loan fund be necessary to meet the equity requirements of increased student fees?

In the matter of provincial funding of post-secondary education, one of the crucial determinants of public revenues will be the level of lease sales and royalty receipts from mineral industries, particularly petroleum and natural gas. Should anything happen to lower or even to stabilize the level of provincial receipts from this source, the financial structure of the province would have to be entirely revised. An interesting policy issue that grows out of the receipt of mineral royalties is how the province will share these royalties with local government. If the province discontinues the practice of distributing 33 per cent of royalty income to local government, as it has indicated it will, this obviously means that more funds will be available in provincial coffers to finance post-secondary education. This may have the result, however, of forcing the provincial government to accept a larger and larger share of elementary and secondary education costs through increased foundation equalization grants to school districts.

A basic policy issue over which the province will have little direct control is the nature and scope of federal support of provincial spending for education. Currently, the federal government will pay up to 50 per cent of allowable operating costs for post-secondary education. It is no exaggeration to suggest that few variables will be as important to the province in meeting costs of education as the continuation and possible growth of federal block grants for post-secondary education. Any reduction in the federal matching grant formula will have grave consequences for the quality and availability of post-secondary education.

While the province approaches the forecast period with a vital set of educational policy issues confronting it, so too will educational institutions be required to identify and resolve a basic question: In the face of what may be mounting public pressure to lower the rate of increase in public spending by the whole set of educational facilities, what economies can the institutions themselves suggest without compromising quality variables? Would initiation of program budgeting allow educators to take a firmer hold on cost structures? What kinds of trade-offs will educators suggest, for example between class size and academic salaries? There appears to be growing evidence that educational institutions are entering an era of "tight" budgets. How well they can innovate program alternatives that keep costs within the bounds imposed by provincial taxpayers will be an important determinant of how well their programs meet the needs of the next 35 years.

APPENDIX A

THE COMPOSITION OF ECONOMIC ACTIVITY IN ALBERTA

In Chapter III attention was directed to the level of provincial economic activity and the prospects of continued economic growth in Alberta. Only brief mention was made of the composition of economic activity in the province. The purpose of this appendix is to provide greater detail on the composition of provincial economic activity by industrial sector.

Agriculture

Cash income in the agriculture crop sector is dominated by the sale of wheat, which shows a strong upward trend but is subject to short-term fluctuations. Cash income (in current prices) increased from $113 million in 1950 to $204 million in 1952, and then fell to a low of $107.4 million in 1954. It passed the $200-million mark again in 1964 ($205 million), and then increased to $236 million in 1966 and $233 million in 1968. Cash income from the sale of wheat in 1969 was more than twice as large as that of 1950 (see Table A-1).

Second in importance in agricultural crops is cash income from the sale of barley, which, although only a fraction of the cash income received from the sale of wheat, showed a substantial increase from 1950 to 1968. From a low of $19 million in 1950 it rose to a high of $67 million in 1968.

Total cash income from the sale of all crops produced in the province reflects secular growth with occasional cyclical variations, increasing from $164 million in 1950 to a high of $322 million in the boom year 1952. In the next ten years it fluctuated between a low of $176 million in 1954 and a high of $237 million in 1962. It reached the $300-million mark again in 1964 ($308 million) and increased to $360 million in 1966 and $372 million in 1968.

Cash income from the sale of livestock and products increased rapidly after 1950, from $189 million to $425 million in 1968. The major source of this income is the sale of cattle and calves, while the sale of hogs constitutes the second most important source. Cash income from the sale of cattle and calves increased from $94 million in 1950 to $265 million in 1968. It showed a tendency to decrease during the mid-1950's but increased in the 1960's almost continuously. Cash income from the sale of hogs rose from $50 million in 1950 to $78 million in 1968.

With the exception of the years 1952, 1956, and 1964, cash income from the sale of livestock and products was higher (often significantly higher, as in the years 1958, 1960, and 1962) than cash income from crop sales.

Alberta's total cash income from the sale of farm products increased from $259 million in 1950 to $811 million in 1968.

The contribution of crops to total cash farm income varied from a low of 37.2 per cent in 1958 to a high of 63.7 per cent in 1952. The contribution of livestock and products fluctuated from a minimum of 35.6 per cent in 1952 to a maximum of 58.7 per cent in 1958. Respective percentages for 1950 and 1968 were 52.6 and 52.4.

Spatial distribution of agricultural activity is partially reflected in the location of farm machinery within the province in the year 1966. Table A-2 indicates a heavy concentration of farm machinery in the Central Region, which in 1966 included between 39.2 and 42.9 per cent of various types of farm machinery in the province. The Northern Region with 20.2 to 25.6 per cent of farm machinery, and the Southern Region with 14.7 to 18.2 per cent, also included significant regional concentrations.

The basic nature and significance of an economic sector is reflected in other ways than net value of production. In the case of agriculture, its importance lies partially in the fact that it satisfies export demand and in the process brings outside dollars into the province. In the agriculture sector there is another factor that indicates its importance to the province, and this is its supply of farm output to manufacturing firms within the province for further processing. In the linkage between agriculture and agricultural processing, there is developed another set of income and employment opportunities.

Table A-3 shows the quantities and the value of these products of manufacturing industries in Alberta which are allied to and dependent upon agriculture. Total value of products produced in the province by these industries increased from $271 million in 1965 to $347 million in 1969. The meat-packing industry is the most important of the agricultural processing industries, accounting for as much as 80 per cent of the total value of agricultural processing output. Flour mills have produced up to 12 per cent of this total value, and creamery butter plants up to 7.2 per cent.

Forestry, Fisheries, Trapping

The value of the forestry harvest in Alberta in 1968-69 amounted to $41 million (see Table A-4). More than $34 million of timber value derived from lumber and coniferous plywood logs, while $5.5 million represented the value of pulpwood.

While the value of output of the forestry sector is not large in relation, for example, to agriculture and mining, data on timber resources included in Table A-5 suggests a considerable potential for continuing growth of the industry based on a renewable resource. The more than 59 billion cubic feet of timber resources available for potential industrial, as well as recreational, use suggests that forestry resources will play an increasingly important role in provincial economic activity. Recent establishment of a viable pulp industry reflects the economic potential of the timber resource. Also important in this context is provincial timber policy based on sustained yield of the forestry base and the necessity of environmental protection in order to insure multiple use of forestry resources, including recreation.

While the value of production of fisheries grew from $1.1 million in 1965 to $1.6 million in 1969, there is little to suggest an increasing role in the provincial setting. The same is true for fur and pelts production which increased in value from $1.1 million in 1965 to $2 million in 1969, while the number of furs and pelts decreased from 1.1 million units in 1965 to .6 million units in 1969 (see Table A-6).

Mining

Importance of the mining sector to the provincial economy is reflected in the fact that net value of mining production grew from 10.9 per cent of the net value of production of all primary and secondary industrial sectors in the province in 1935 to 33.9 per cent in 1969. The value of total mineral production in the province increased from $41 million in 1941 to $168 million in 1951, $474 million in 1961 and to an imposing $1.2 billion in 1969 (see Table A-7).

Crude petroleum is the most important mineral product. In 1969 it accounted for 61.3 per cent of the total value of all mineral products. The value of crude petroleum rose from $14 million in 1941 to $731 million in 1969. In the last nine years (1961 to 1969), the value of crude oil produced in the province has more than doubled.

Natural gas is the second most important mineral in the province and accounted for 18.3 per cent of total value of minerals produced in 1969. Its value increased from $5.2 million in 1941 to $218.8 million in 1969. During the period 1961-1969 the value of natural gas output increased by 350 per cent.

Production of natural gas by-products started relatively late in Alberta, but their importance has increased rapidly. Value of natural gas by-products in the province increased more than five-fold between 1961 and 1969, from $23.1 million to $129.8 million.

Importance of coal declined during the 1950's, but showed signs of recovery in the 1960's. The value of coal increased from $19.4 million in 1941 to $41 million in 1951, but then fell to $10.5 million in 1961. By 1969 it had increased to $13.9 million, a 32 per cent gain for the nine-year period.

Total value of structural materials was only 2.3 per cent of total value of mineral production. The most important product in this group is cement, its value increasing from $7 million in 1941 to $19 million in 1969, followed by sand and gravel, the value of which grew from $.4 million in 1941 to $11 million in 1969.

Among non-metallics, elemental sulphur became an important source of income in the 1960's. Its value rose from $6 million in 1961 to $61 million in 1969, a ten-fold increase. In 1969 the value of elemental sulphur accounted for 5.1 per cent of the total mineral value.

Petroleum Production

The Province of Alberta is the major producer of petroleum in Canada. As shown in Table A-8, the number of barrels of crude oil produced in the province rose from 10.5 million in 1948 to 250.7 million in 1968. Corresponding figures for Western Canada were 11.7 million barrels in 1948 and 371.7 million barrels in 1968. Nationally, the amount of crude oil produced was 11.9 million barrels in 1948 and 372.7 million barrels in 1968.

Since 1948 Alberta's share of national production of crude oil has never been below 63.3 per cent (1966), while at times it was as high as 96.2 per cent (1952). In 1968 the share was 67.3 per cent.

On the basis of estimated proven remaining reserves of liquid hydrocarbons in Canada, Alberta can expect to continue to dominate the country's petroleum production. Figures for these reserves for 1956, 1962, 1966, and 1968 are shown in Table A-9. These data indicate that Alberta has nearly 87 per cent of the total estimated proven remaining reserves of crude oil in Canada and more than 97 per cent of the respective natural gas liquid reserves.

Expenditures for petroleum exploration and development in Alberta increased from $25 million in 1947 to $610 million in 1968. Exploration investment was reflected in an increase in the number of producing oil wells in the province from 502 in 1947 to 13,733 in 1968 (see Table A-10).

Most of the crude oil produced in Alberta is marketed outside the province and a significant amount is marketed outside Canada. In 1968, approximately 77.5 per cent of this crude oil was sold outside the Prairies (see Table A-10).

In Table A-11 are listed crude oil fields in Alberta, showing their production for selected years from 1914 to 1968 and their share of 1968 production.

Natural Gas Production

Alberta dominates production of natural gas in Canada. The province's production of natural gas increased from 56.6 billion cubic feet in 1948 to 1.4 trillion cubic feet in 1968. During the same period national production rose from 66.2 billion to 1.8 trillion cubic feet. Alberta's share of the total Canadian production of natural gas fluctuated between a high of 90.3 per cent in 1952 and a low of 69.1 per cent in 1958. In the late 1960's it was slightly over 80 per cent (see Table A-12).

The province accounted for more than 82 per cent of the estimated proven reserves of natural gas in Canada in 1968. There is little evidence of any tendency in the share of the province to decline (see Table A-13).

The number of producing and capped gas wells grew from 296 in 1947 to 3,933 in 1968. The major part of the output of gas wells of the province is consumed outside Alberta (see Table A-10).

Electric Power

It was noted in Chapter III that the value of electric power production has increased in absolute terms but has shown considerable long-term stability relative to the total net value of all primary and secondary industrial production.

Of the three sources of electric power — hydroelectric, steam, and internal combustion — steam is the most important in Alberta (see Table A-14). Hydroelectric power is of considerable importance while the use of internal combustion power is limited. Of total net power capability of 1,894,665 K.W. in 1968, nearly 60 per cent was generated by steam and about 36 per cent was hydroelectric.

Total net power generation in the province in 1968 was 7,066,451 M.W.H., of which 5,710,050 M.W.H. was derived from steam, 1,063,210 M.W.H. was hydroelectric, and 293,191 M.W.H. was internal combustion power.

Manufacturing

Manufacturing has been an important and stable component of primary and secondary output in the Province of Alberta for at least thirty-five years. The manufacturing sector is analyzed in

Tables A-15, A-16, and A-17. In 1968 there were 1,848 manufacturing establishments in the Province of Alberta employing 48,557 persons who produced a total value added of $604 million. A total of $274 million was paid in salaries and wages.

With regard to the geographic distribution of manufacturing, the Edmonton and Calgary Regions have by far the largest manufacturing sectors in the province (see Table A-16).

Construction

The value of construction work performed in the province increased from $550 million in 1954 to $1.6 billion in 1969 (see Table A-18).

Building construction was the largest component of construction in 1954, but it gradually yielded to engineering construction. The value of total building construction increased from $288 million to $769 million between 1954 and 1969. The most important type of building construction is residential construction while the major form of engineering construction relates to the construction of gas and oil facilities. The value of total engineering construction increased from $262 million in 1954 to $792 million in 1969.

The average number of persons employed in construction rose from 50,934 in 1954 to 65,657 in 1969. Total salaries and wages paid to construction workers increased from $173 million in 1954 to $490 million in 1969 (see Table A-18).

Value of building permits in the province increased from $54 million in 1948 to $188 million in 1956, $219 million in 1964, and $478 million in 1969.

Building construction, predictably enough, is concentrated in the Edmonton and Calgary Regions. As shown in Table A-19, the Edmonton Region accounted for 52 per cent of the value of building permits in the province in 1948, and 44.3 per cent in 1969.

With regard to major cities as opposed to regions of the province, Calgary experienced the most dramatic increase in the value of building permits, from $14 million in 1948 to $172 million in 1969. Table A-20 shows that as a result of this increase the city's share of the provincial total increased from 26.2 to 36.1 per cent during that period.

Edmonton's value of building permits increased from $27 million in 1948 to $170 million in 1969 but its share of the provincial total fell from 50.7 to 36.1 per cent. Calgary and Edmonton had a combined share of 71.7 per cent of the provincial total value of building permits in 1969, down from 76.9 per cent in 1948.

Service Sectors in Alberta

Thus far the discussion of the composition of provincial economic activity has centered on the major characteristics of primary and secondary industrial activities. This section draws attention to the economic sectors concerned primarily with the production and distribution of services rather than hard and soft goods.

Wholesale Trade

Total value of wholesale trade in the province rose from $1.2 billion in 1966 to $1.5 billion in 1969, an increase of 26 per cent over the four-year period (see Table A-21).

The most important type of wholesale trade is the sale of groceries and meats, which accounted for 37.5 per cent of all wholesale trade in 1966 and for 37.1 per cent in 1969. The sale of petroleum and petroleum products accounted for 17 per cent of wholesale trade in 1966 and 16 per cent in 1969. Most wholesale trade activities take place in Edmonton and Calgary (40 per cent and 33 per cent, respectively, of the total wholesale trade in the province).

Retail Trade

Retail trade sales increased from $1.5 billion in 1964 to $2.2 billion in 1969 (see Table A-22). Motor vehicle dealers were responsible for approximately 20 per cent of the retail trade of the province, and grocery and combination store sales for 17-18 per cent. Department stores accounted for 13.6 per cent, and garage and filling stations for about 10 per cent.

The Edmonton Region was responsible for 34.6 per cent of the province's total retail trade in 1966, while the Calgary Region accounted for 28 per cent of the total (see Table A-23).

Community, Business, and Personal Services

Table A-24 shows the regional distribution of community, business, and personal services in the Province of Alberta in 1966. The Edmonton Region had the largest share, with 35 per cent of the total value, while the Calgary Region accounted for 32 per cent of the total.

With regard to the composition of community, business, and personal services sectors in the province, the largest sub-sector is hotels, tourist camps, and restaurants, which accounted for more than 56 per cent of the total value. Personal services constituted 12 per cent of the total.

The already high and still rising importance of the tourist sector in the province is partly reflected in the growing number of visitors to national parks in Alberta (see Table A-25). The number of visitors increased from 2.6 million in 1964 to 4.1 million in 1969. More than half the visitors went to Banff, while a little less than 25 per cent visited Jasper. The numbers of visitors to the Waterton Lakes and Elk Island Parks were significantly smaller.

Public and Private Investment in Alberta

The final indicator of economic activity reported here is the value of public and private investment in the province, covering the period from 1948 to 1969. Total public and private investment for capital and repair expenditures increased from $390 million in 1948 to $2.4 billion in 1969 (see Tables A-26 and A-27).

TABLE A-1
CASH INCOME FROM SALE OF FARM PRODUCTS, ALBERTA, 1950 - 1968

(thousands of dollars)

	Wheat	Barley	Total Crops	Cattle and Calves	Hogs	Total Livestock and Products	Total Cash Income	Total Crops As Per Cent Of Cash Income	Total Livestock And Products As Per Cent Of Cash Income
1950	113,270	18,980	164,126	93,771	49,803	189,122	359,289	45.7	52.6
1952	204,225	56,689	321,905	72,366	55,690	180,060	505,114	63.7	35.6
1954	107,367	29,501	176,326	74,391	67,848	200,872	379,043	46.5	53.0
1956	134,720	34,598	215,918	85,731	59,266	209,853	427,918	50.5	49.0
1958	113,025	33,515	186,139	146,419	77,483	293,695	500,071	37.2	58.7
1960	118,441	30,256	194,132	142,136	60,528	274,307	496,372	39.1	55.3
1962	149,521	37,929	236,579	171,429	72,143	316,331	575,393	41.1	55.0
1964	205,562	46,456	308,331	148,892	63,498	288,726	602,178	51.2	47.9
1966	235,604	55,438	359,503	234,665	78,780	395,359	768,930	46.8	51.4
1968	233,067	67,281	371,474	264,456	78,307	425,215	810,900	45.8	52.4

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-2
REGIONAL LOCATION, FARM MACHINERY, ALBERTA, 1966

			Southern Region[1]		Central Region[2]		Northern Region[3]	
		Alberta	Total	Per Cent Of Alberta	Total	Per Cent Of Alberta	Total	Per Cent Of Alberta
Automobiles	No.	53,171	7,829	14.7	21,832	41.0	11,826	22.2
Motor Trucks	No.	85,559	15,568	18.2	34,005	39.7	19,561	22.9
Tractors	No.	112,245	17,137	15.3	43,954	39.2	28,733	25.6
Grain Combines	No.	42,838	6,435	15.0	18,365	42.9	10,886	25.4
Pick-Up Hay Balers	No.	25,161	4,105	16.3	10,589	42.1	5,094	20.2

		Mountain Region[4]		Edmonton Region[5]		Calgary Region[6]	
		Total	Per Cent Of Alberta	Total	Per Cent Of Alberta	Total	Per Cent Of Alberta
Automobiles	No.	701	1.3	6,984	13.1	3,999	7.5
Motor Trucks	No.	1,179	1.4	8,846	10.3	6,400	7.5
Tractors	No.	1,850	1.6	12,813	11.4	7,758	6.9
Grain Combines	No.	269	0.6	4,168	9.7	2,715	6.3
Pic-Up Hay Balers	No.	411	1.6	2,962	11.8	2,000	11.8

[1] Census Divisions 1, 2 and 3.

[2] Census Divisions 4, 5, 7, 8 and 10.

[3] Census Divisions 12, 13 and 15.

[4] Census Divisions 9 and 14.

[5] Census Division 11.

[6] Census Division 6.

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-3

MANUFACTURING INDUSTRIES ALLIED TO AGRICULTURE, ALBERTA, 1965 - 1969

		1965	1966	1967	1968	1969
Flour Mills (Seven Firms)						
Production	Centals	6,270,552	6,845,125	5,974,167	6,305,919	5,111,139
All Mill Products Shipped	Value $	32,072,489	37,567,660	34,844,932	36,319,533	30,520,817
Creamery Butter (1)						
Production	lbs.	36,561,769	34,543,569	33,395,938	32,039,904	29,540,437
	Value $	19,640,983	20,429,067	21,229,798	20,652,923	19,127,432
Cheddar Cheese (1)						
Production	lbs.	2,188,019	2,301,920	3,103,203	3,303,166	2,806,241
	Value $	881,552	975,783	1,372,857	1,496,005	1,262,810
Packing Plants						
Gross Sales	$	291,147,010	337,079,986	357,837,783	382,352,794	402,090,725
Production	Meat—lbs.	661,884,692	669,340,324	723,276,994	776,391,535	689,086,880
	Value $	216,119,065	250,665,231	270,094,776	287,786,062	292,130,689
Exports	Meat—lbs.	417,601,966	445,495,392	481,357,879	491,549,892	424,229,703
	Value $	143,394,470	173,718,564	190,341,702	193,217,740	187,585,698
Margarine Sales	lbs.	9,675,009	13,659,784	14,542,575	15,370,007	16,040,628
	Value $	2,682,729	3,941,819	4,156,401	4,236,858	4,340,796

Source: Alberta Department of Industry and Tourism, **Annual Review of Business Conditions, 1969.**

TABLE A-4

FORESTRY HARVEST, BY VOLUME and VALUE, ALBERTA, 1968 - 69

Products	Unit	Volume	Product Value $
Christmas Trees	no. trees	13,180	6,590
Fuelwood	cords	3,138	15,690
Lath	pieces	2,500,000	100,000
Lumber and Coniferous Plywood Logs	fbm.	466,983,210	34,089,774
Mine Ties	pieces	1,922	961
Pulpwood	cords	316,029	5,530,507
Plywood Logs — Poplar	fbm.	4,251,074	148,787
Railway Ties	pieces	331,132	678,821
Round Timber	cubic feet	1,959,822	862,322
Slabs	cords	186	372
Trees for Transplanting	no. trees	3,878	1,939
TOTAL VALUE			41,435,763

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-5

TIMBER RESOURCES OF ALBERTA

	Diameter Class (inches)	Volume (cu. ft.)	Per Cent
Coniferous:			
Spruce, white	4 to 11	6.8 billion	11
Spruce, white	12 and over	9.5 billion	16
Pine, jack and lodgepole	4 to 10	10.4 billion	18
Pine, jack and lodgepole	11 and over	5.4 billion	9
Spruce, black	4 and over	2.5 billion	4
Fir, balsam	4 and over	1.2 billion	2
Deciduous:			
Poplar and birch	4 and over	23.4 billion	40
TOTALS		59.2 billion	100

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-6

FUR PELTS AND FISHERIES PRODUCTION, ALBERTA, 1965 - 1969

		1965	1966	1967	1968	1969
Fur (Wild Life) Pelts	No.	1,100,448	806,667	797,896	820,704	646,452
	Value $	1,128,103	1,760,961	1,783,666	1,520,347	1,996,232
Fisheries Production	lbs.	8,514,048	10,888,364	9,912,027	11,880,547	10,968,288
	Value $	1,128,103	1,397,578	1,426,364	1,476,517	1,559,454

Source: Department of Industry and Tourism, **Alberta Review of Business Conditions**, 1969.

TABLE A-7

MINERAL PRODUCTION, ALBERTA, 1941 - 1969

		1941	1951	1961	1969+	Per Cent Of Total Mineral Value, 1969	Per Cent Change 1961 - 1969
FUEL							
Coal	Tons	6,969,962	7,659,329	2,027,826	4,422,036	1.2	32.7
	$	19,382,471	40,981,581	10,472,978	13,895,992		
Natural Gas	M.Cu.Ft.	30,905,440	69,876,831	500,843,900	1,609,325,945	18.3	347.6
	$	5,175,364	3,493,842	48,882,365	218,791,048		
Natural Gas, By-Products	Bbls.	—	—	—	—	10.9	463.1
	$	—	—	23,059,867	129,845,296		
Petroleum, Crude	Bbls.	9,918,577	45,915,384	157,811,712	284,241,338	61.3	105.7
	$	13,985,906	113,870,152	355,530,845	731,121,266		
STRUCTURAL MATERIALS							
Clay Products	$	952,144	1,787,731	3,517,473	3,839,766	0.3	9.2
Cement	Bbls.	492,515	1,649,909	3,873,794	4,894,537	1.6	54.1
	$	985,030	3,898,043	12,420,025	19,138,991		
Lime	Tons	17,950	30,670	47,506	85,782	0.2	107.1
	$	151,296	395,452	838,365	1,736,220		
*Sand and Gravel	Tons	956,484	4,289,021	12,591,944	13,700,000	0.1	— 1.2
	$	433,504	3,194,446	10,927,057	10,800,000		
Stone	Tons	7,942	13,310	96,753	225,300	0.1	106.8
	$	24,303	46,820	337,150	697,200		
METALS							
Gold	Fine oz.	215	97	171	100	**	— 37.8
	$	8,277	3,574	6,064	3,770		
Silver	Fine oz.	21	9	17	10	**	18.8
	$	8	8	16	19		
NON-METALLICS							
Peat Moss	Tons	421	—	—	8,000	**	91.7[1]
	$	5,055	—	—	232,100		
Quartz	Tons	—	—	—	—	—	—
	$	—	—	—	—		
Salt	Tons	16,617	19,718	83,880	125,469	0.2	81.7
	$	260,995	472,562	1,355,074	2,462,092		
Sulphur, Elemental	Tons	—	—	339,080	2,894,200	5.1	990.0
	$	—	—	6,133,261	60,716,042		
TOTAL VALUE	$	41,364,353	168,144,211	473,480,540	1,193,279,802		

+ Preliminary ** Negligible.

* Sand and gravel are not legally minerals in Alberta but are part of the surface in accordance with the Sand and Gravel Act, 1951.

[1] 1966 - 1969

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-8

CRUDE OIL PRODUCTION, ALBERTA, WESTERN CANADA, AND CANADA, 1948-1968

(thousands of barrels)

	Alberta*	Canada Western	Canadian Total	Alberta as Per Cent of Canada
Cumulative to Dec. 31, 1947	82,130	85,269	116,823	
1948	10,505	11,698	11,896	88.3
1950	27,149	28,378	28,646	94.8
1952	58,837	60,955	61,162	96.2
1954	87,593	95,534	95,960	91.3
1956	143,682	171,143	171,787	83.6
1958	112,471	163,885	164,687	68.3
1960	130,499	188,496	189,515	68.9
1962	165,098	242,960	244,104	67.6
1964	175,089	273,024	274,277	63.8
1966	202,508	318,345	319,675	63.3
1968	250,675	371,663	372,747	67.3
TOTAL	2,707,339+	3,767,387+	3,851,170+	

* Some condensate included prior to 1951. + Cumulative, all time.

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-9

ESTIMATED PROVEN REMAINING RESERVES OF LIQUID HYDROCARBONS IN CANADA AT YEAR END, 1956 - 1968

(In 35 Imperial Gallons Barrels which are equivalent to 42 U.S. Gallon Barrels)

(thousands of barrels)

Crude Oil	1956	1962	1966	1968
Northwest Territories	53,258	50,412	47,125	46,959
British Columbia	2,482	136,577	263,784	287,246
Alberta	2,389,296	3,807,009	6,720,500	7,253,019
Saskatchewan	358,693	462,372	696,785	720,503
Manitoba	42,005	14,928	58,330	67,713
Total Western Canada	2,845,734	4,471,398	7,786,524	8,375,440
Ontario			5,222	6,093
Other Eastern Canada	3,636	9,404	5	80
Total Crude Oil	2,849,370	4,480,702	7,791,751	8,381,613
Natural Gas Liquids				
British Columbia	28,884	35,779	41,025	37,833
Saskatchewan	—	11,540	9,233	9,359
Alberta	251,050	648,021	1,208,609	1,588,769
Total Natural Gas Liquids	279,934	695,350	1,258,867	1,635,961
Total Liquid Hydrocarbons in Canada	3,129,304	5,176,052	9,050,618	10,017,574

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-10
PETROLEUM INDUSTRY ACTIVITY, ALBERTA, 1947 - 1968

	1947	1956	1962	1968
Producing Oil Wells	502	7,390	10,809	13,733
Producing Gas Wells	177	523	1,257	2,356
Capped Gas Wells	119	713	1,388	1,597
Expenditures on Exploration and Development ($)	25,000,000	400,000,000	365,000,000	610,000,000
Crude Oil Production (bbls.)	6,382,065	143,709,724	165,124,967	251,461,840
Average Daily	20,000	434,000	451,000	752,000
Possible Daily	20,000	746,000	956,000	1,550,000
Market Distribution				
Prairies	6,341,306	42,011,014	48,496,782	63,903,730
British Columbia	—	21,894,038	19,431,279	20,723,165
Other Canadian and Exports	—	80,325,223	113,210,013	202,601,095
Natural Gas Production (mcf)	53,321,858	200,191,107	843,816,821	1,642,194,881
Consumed in Alberta	39,077,953	116,938,508	185,718,278	282,787,861
Consumed outside Alberta	—	11,755,193	455,374,219	882,318,580

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-11
ALBERTA CRUDE OIL FIELDS PRODUCTION, 1914 - 1968

(millions of barrels)

	1914-1959	1961	1966	1968	Total	Per Cent of 1968 Total
Acheson	19.6	2.3	2.3	2.5	40.2	1.0
Bantry	0.6	0.3	1.6	2.0	9.5	0.8
Bonnie Glen	49.7	6.3	7.4	9.8	116.4	9.0
Carson Creek North	—	0.9	2.6	2.8	15.8	1.1
Clive	—	—	—	1.5	3.0	0.6
Fenn Big Valley	46.1	6.1	5.7	6.0	97.5	2.4
Garrington	0.5	0.7	1.0	—	7.8	—
Gilby	3.9	1.5	1.3	1.4	18.1	0.6
Golden Spike	19.5	2.9	4.6	6.8	55.1	2.7
Harmattan East	1.6	1.9	1.9	1.7	19.9	0.7
Harmattan Elkton	6.2	2.2	1.5	1.5	21.9	0.6
Innisfail	3.7	2.5	1.8	1.7	23.9	0.7
Joarcam	33.3	3.3	2.5	2.6	59.0	1.0
Joffre	20.5	5.7	1.7	1.7	51.7	0.7
Judy Creek	0.1	3.5	9.9	14.2	69.3	5.7
Kaybob	1.6	2.4	2.8	3.5	26.2	1.4
Kaybob South	—	—	1.7	1.6	8.4	0.6
Leduc-Woodbend	188.1	15.2	8.1	7.4	285.6	3.0
Medicine River	0.4	0.3	1.8	2.1	11.8	0.8
Mitsue	—	—	4.3	5.8	17.3	2.3
Nipisi	—	—	2.8	4.8	12.4	2.0
Pembina	159.2	42.7	37.8	39.6	513.5	15.8
Rainbow	—	—	2.6	13.4	25.6	5.3
Rainbow South	—	—	—	2.0	3.3	0.8
Red Earth	—	—	—	1.1	2.0	0.4
Redwater	217.0	15.4	15.4	15.9	356.6	6.3
Simonette	0.1	0.6	1.2	—	6.9	—
Snipe Lake	—	—	2.9	2.3	12.9	1.0
Stettler	12.1	1.8	1.3	1.3	25.4	0.5
Sturgeon Lake South	11.5	3.2	3.5	3.5	39.7	1.4
Sundre	4.1	1.2	1.1	—	13.0	—
Swan Hills	1.8	5.7	20.5	25.4	126.4	10.1
Swan Hills South	0.1	3.0	8.9	10.1	53.8	4.0
Turner Valley	107.9	1.1	1.0	—	116.9	—
Virgo	—	—	—	1.1	1.1	0.4
Virginia Hills	0.1	2.4	4.5	4.2	29.5	1.7
Wainwright	4.5	0.6	1.8	2.1	14.3	0.8
Westerose	10.2	1.5	1.6	2.3	25.3	1.0
Willesden Green	2.0	1.6	3.0	3.9	23.4	1.6
Wizard Lake	25.9	3.5	4.2	5.5	62.0	2.2
Zama	—	—	—	6.1	8.8	2.4
Other Fields and Areas	91.3	15.5	24.0	29.5	276.1	11.8
Production		157.8	202.6	250.7	2,707.3	
Cumulative Total	1,043.2	1,331.5	2,226.4	2,707.3		

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-12

NATURAL GAS PRODUCTION,* ALBERTA, WESTERN CANADA, AND CANADA, 1948 - 1968

(millions of cubic feet at 14.65 psia and 60° F.)

	Alberta	Western Canada	Canadian Total	Alberta as Per Cent of Canada
Cumulative to Dec. 31, 1947	1,726,119	1,720,413	2,193,431	
1948	56,566	57,157	66,167	85.5
1950	72,052	72,934	81,306	88.6
1952	91,380	92,655	101,159	90.3
1954	128,999	134,027	144,226	89.4
1956	167,983	208,218	221,219	85.0
1958	271,462	376,631	392,903	69.1
1960	410,651	548,332	565,418	72.6
1962	782,724	972,865	988,695	79.2
1964	993,446	1,203,922	1,217,920	81.6
1966	1,147,260	1,413,615	1,429,337	80.3
1968	1,429,153	1,770,940	1,783,238	80.2
TOTAL	11,998,003+	14,350,587+	15,082,743+	

* Raw natural gas production less storage and injection. + Cumulative, all time.

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-13

ESTIMATED PROVEN RESERVES OF NATURAL GAS IN CANADA AT YEAR END, 1956 - 1968

(millions of cubic feet at 14.65 psia and 60° F.)

	1956	1962	1966	1968
Northwest Territories	29,974	61,897	117,320	156,398
British Columbia	1,590,940	4,932,600	7,265,690	7,462,938
Alberta	16,333,084	29,177,363	35,135,103	39,119,502
Saskatchewan	889,907	1,062,201	729,278	705,036
Manitoba	3,738	1,060	—	—
Total Western Canada	18,847,643	35,235,121	43,247,391	47,443,874
Eastern Canada	150,612	201,771	202,704	222,587
Total Canada	18,998,255	35,436,892	43,450,095	47,666,461

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-14

NET CAPABILITY, NET PEAK LOAD, AND NET GENERATION BY TYPE OF POWER SOURCE, ALBERTA, 1968

Name of Company	Net Capability K.W.	Net Peak Load K.W.	Net Generation M.W.H.
Hydro			
Calgary Power Ltd.	680,000	588,200	1,059,331
Northland Utilies Ltd.	1,400	900	3,879
Total Hydro	681,400		1,063,210
Steam			
Calgary Power Ltd.	569,000	579,500	3,334,050
Canadian Utilities Ltd.	90,500	65,000	470,291
City of Edmonton	392,000*	352,000	1,547,374[1]
City of Lethbridge	30,700*	31,000	150,607[2]
City of Medicine Hat	40,500	40,000	207,728[3]
Total Steam	1,122,700		5,710,050
Internal Combustion			
Calgary Power Ltd.	—	—	81
Canadian Utilities Ltd. and Northland Utilities Ltd.	90,565*	59,026	293,110
Total Internal Combustion	90,565		293,191
GRAND TOTAL	1,894,665		7,066,451

* Includes gas turbines.

[1] Includes 125,728,500 K.W.H. supplied to system.

[2] Includes 9,274,200 K.W.H. supplied to system.

[3] Includes 57,830,700 K.W.H. supplied to system.

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-15

FIRMS, EMPLOYEES, WAGES AND SALARIES, AND VALUE ADDED BY MANUFACTURING SUB-SECTORS, ALBERTA, 1968

	Establishments (No.)	Employees			Salaries and Wages	Value Added*
		Male (No.)	Female (No.)	Total (No.)		
Food and Beverage Industries	468	11,040	2,908	13,948	$75,615,069	$164,995,030
Rubber Industries (1)	—	—	—	—	—	—
Leather Industries	9	122	55	177	775,627	1,255,536
Textile Industries	21	299	284	583	3,348,687	5,679,365
Knitting Mills (2)	—	—	—	—	—	—
Clothing Industries	21	384	1,650	2,034	8,022,727	13,266,215
Wood Industries	280	4,064	388	4,452	21,344,882	35,560,885
Furniture and Fixture Industries	109	1,003	251	1,254	5,516,780	8,758,012
Paper and Allied Industries	20	1,137	242	1,379	9,154,833	22,129,404
Printing, Publishing and Allied Industries	218	2,563	960	3,523	19,450,057	36,499,336
Primary Metal Industries	23	2,646	141	2,787	20,253,180	40,287,161
Metal Fabricating Industries (except Machinery and Transportation Equipment Industries)	210	4,802	384	5,186	30,855,809	57,216,446
Machinery Industries (except Electrical Machinery)	45	1,051	70	1,121	6,747,942	11,851,115
Transportation Equipment Industries	68	2,443	222	2,665	13,452,007	19,685,877
Electrical Products Industries	17	419	191	610	3,005,602	10,557,896
Non-Metallic Mineral Products Industries	105	3,126	439	3,565	21,015,312	50,020,709
Petroleum and Coal Products Industries	14	1,015	44	1,059	8,645,449	35,648,883
Chemical and Chemical Products Industries	43	2,167	166	2,333	17,602,896	61,217,444
Other Manufacturing Industries	177	1,519	362	1,881	9,442,109	20,081,313
GRAND TOTALS	1,848	39,800	8,757	48,557	$274,248,968	$603,728,627

* "Value Added" does not include change of the inventory of "Goods in Process" and "Finished Goods."

(1) Rubber Industries — Rubber tire and tube manufacurers, 2; Other rubber industries, 2 — included in Other Manufacturing Industries.

(2) Knitting Mills — Other Knitting Mills, 2 — included in Other Manufacturing Industries.

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-16

MANUFACTURING ACTIVITY BY REGIONS, ALBERTA, 1968

	Establishments (No.)	Employees			Salaries and Wages	Value Added*
		Male (No.)	Female (No.)	Total (No.)		
Southern Region[1]	203	4,855	1,069	5,924	$ 29,669,720	$ 66,979,138
Central Region[2]	220	2,103	358	2,461	13,055,990	30,028,936
Northern Region[3]	220	1,768	225	1,993	8,336,637	15,228,940
Mountain Region[4]	75	1,265	111	1,376	7,916,095	20,568,105
Edmonton Region[5]	608	17,093	4,561	21,654	126,639,694	278,342,966
Calgary Region[6]	523	12,716	2,443	15,149	88,630,832	192,580,542
TOTAL	1,848	39,800	8,757	48,557	$274,248,968	$603,728,627

[1] Southern Region includes Census Divisions 1, 2 and 3.
[2] Central Region includes Census Divisions 4, 5, 7, 8 and 10.
[3] Northern Region includes Census Divisions 12, 13 and 15.
[4] Mountain Region includes Census Divisions 9 and 14.
[5] Edmonton Region includes Census Division 11.
[6] Calgary Region includes Census Division 6.

* "Value Added" does not include change of the inventory of "Goods in Process" and "Finished Goods."

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-17

VALUE OF FACTORY SHIPMENTS BY MANUFACTURING SECTOR AND SUB-SECTOR, ALBERTA, 1957 - 1969

(millions of dollars)

	1957	1959	1961	1963	1965	1967	1969	Change, $ Value, 1957-1969	Per Cent Of Provincial 1957 Total	Per Cent Of Provincial 1969 Total
Food and Beverage Industries	307.0	363.6	394.4	454.6	512.7	635.3	710.0	403.0	42.4	40.4
Textile Industries	6.4	7.7	7.8	9.4	10.4	12.2	12.0	5.6	0.9	0.7
Clothing Industries	9.3	11.2	12.8	17.6	22.7	22.0	25.0	15.7	1.3	1.4
Wood Industries	41.1	44.9	39.6	52.9	58.3	90.0	85.0	43.9	5.7	4.8
Furniture and Fixture Industries	7.6	9.3	9.1	10.5	12.4	16.8	17.0	9.4	1.0	1.0
Paper and Allied Industries	17.4	35.3	41.3	46.0	47.4	49.2	55.0	37.6	2.4	3.1
Printing, Publishing and Allied Industries	24.8	28.8	35.1	33.2	39.7	47.0	56.0	31.2	3.4	3.2
Primary Metal Industries	35.7	39.2	67.8	51.0	87.9	106.7	140.0	104.3	4.9	8.0
Metal Fabricating Industries (except Machinery and Transportation Equipment Industries)	49.8	52.6	56.1	72.3	101.8	97.9	118.0	68.2	6.8	6.7
Machinery Industries (except Electrical Machinery)	2.8	2.7	6.7	14.9	20.0	25.6	28.0	25.2	0.4	1.6
Transportation Equipment Industries	28.4	28.1	14.0	16.2	20.5	41.5	70.0	41.6	3.9	4.0
Electrical Products Industries	3.8	5.0	7.0	8.6	11.2	20.5	26.0	22.2	0.5	1.5
Non-Metallic Mineral Products Industries	41.0	51.5	60.5	65.9	80.2	91.8	112.0	71.0	5.7	6.4
Petroleum and Coal Products Industries	103.8	108.6	108.6	125.3	136.2	145.7	166.0	62.2	14.3	9.4
Chemical and Chemical Products Industries	41.0	55.3	61.3	81.0	91.2	114.9	99.0	58.0	5.7	5.6
Other Manufacturing Industries[1]	4.6	6.5	17.0	24.9	30.7	32.9	38.0	33.4	0.6	2.2
TOTAL	724.5	850.3	935.5	1,084.3	1,283.3	1,550.0	1,757.0			

[1] Includes: "Leather Products," "Rubber Products," "Knitting."

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-18

VALUE OF CONSTRUCTION WORK PERFORMED — ALBERTA, 1954 - 1968

(thousands of dollars)

	1954	1960	1964	1968*	1969+	Per Cent Change 1954-1968	Per Cent of 1968 Total
Total Construction	550,258	815,793	919,871	1,465,393	1,561,152	166.3	
Total Building Construction	287,976	389,184	442,900	687,403	768,825	138.7	46.9
Residential	140,200	177,400	214,200	326,600	353,600	133.0	22.3
Industrial	16,722	25,368	21,641	22,751	20,093	36.1	1.6
Commercial	63,416	65,180	75,596	113,083	139,337	78.3	7.7
Institutional	30,977	68,668	85,048	155,651	180,096	402.5	10.6
Others	36,661	52,568	46,415	69,318	75,699	89.1	4.7
Total Engineering Construction	262,282	426,609	476,971	777,990	792,327	196.5	53.1
Road, Highway and Aerodrome	60,766	106,922	87,003	87,296	90,804	43.7	6.0
Waterworks and Sewage Systems	19,167	17,819	26,335	43,364	51,419	126.1	3.0
Dams and Irrigation	7,383	5,894	7,793	12,799	15,711	73.4	0.9
Electric Power	12,814	20,415	21,346	50,527	49,258	294.3	3.4
Railway, Telephone and Telegraph	29,167	36,455	41,049	72,801	50,519	149.6	5.0
Gas and Oil Facilities	113,221	218,300	254,276	408,386	452,301	260.7	27.9
Other Engineering	19,764	20,804	39,169	102,817	82,315	420.2	7.0
Salaries and Wages	172,931	244,218	282,535	460,341	490,193	166.2	
Cost of Materials Used	247,360	370,242	418,845	611,215	652,549	147.1	
Average Number of Employees (No.)	50,934	57,070	53,463	65,888	65,657	29.4	

* Preliminary. + Intentions.

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-19

VALUE OF BUILDING PERMITS, PROVINCE AND REGIONS, 1948 - 1969

(thousands of dollars)

	1948	1956	1964	1969	Per Cent of Provincial 1948 Total	Per Cent of Provincial 1969 Total
Southern Region[1]	6,181	13,934	14,773	31,829	11.5	6.7
Central Region[2]	4,189	11,884	25,548	25,017	7.8	5.2
Northern Region[3]	671	5,616	15,598	24,441	1.3	5.1
Mountain Region[4]	99	6,474	10,373	6,391	0.2	1.3
Edmonton Region[5]	27,777	84,798	118,803	211,505	51.9	44.3
Calgary Region[6]	14,620	65,510	103,718	178,755	27.3	37.4
Alberta Total	53,537	188,216	218,813	477,938		

[1] Southern Region includes Census Divisions 1, 2 and 3.

[2] Central Region includes Census Divisions 4, 5, 7, 8 and 10.

[3] Northern Region includes Census Divisions 12, 13 and 15.

[4] Mountain Region includes Census Divisions 9 and 14.

[5] Edmonton Region includes Census Division 11.

[6] Calgary Region includes Census Division 6.

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-20

VALUE OF BUILDING PERMITS, SELECTED CITIES IN ALBERTA, 1948 - 1969

(thousands of dollars)

					City as a Per Cent of Provincial Total	
	1948	1956	1964	1969	1948	1969
Medicine Hat	942	4,473	4,247	5,385	1.8	1.1
Lethbridge	4,464	7,001	5,600	17,684	8.3	3.7
Drumheller	302	175	339	2,160	0.6	0.5
Calgary	14,003	58,960	95,559	172,372	26.2	36.1
Red Deer	1,213	3,525	7,979	7,242	2.3	1.5
Camrose	418	941	2,474	1,541	0.8	0.3
Lloydminster	—	315	2,360	2,361	0.8*	0.5
Edmonton	27,123	69,404	103,111	170,094	50.7	35.6
Wetaskiwin	220	636	767	2,111	0.4	0.5
Grande Prairie	237	2,101	2,878	3,719	0.4	0.8
TOTAL TEN CITIES	48,922	147,531	225,314	384,668		
TOTAL ALBERTA	53,537	188,216	288,813	477,939		

* 1950

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-21

WHOLESALE TRADE, TRENDS, ALBERTA, 1966 - 1969

(dollars)

	1966	1967	1968	1969
By Types:				
Amusement and Sporting Goods	5,089,000	6,732,000	8,588,000	9,600,000
Auto Supplies and Equipment	44,510,000	47,935,000	63,205,000	71,356,000
Chemicals, Drugs and Allied Products	40,544,000	45,052,000	45,973,000	49,931,000
Dry Goods and Apparel	14,758,000	14,510,000	15,473,000	15,711,000
Electric Goods (Household and Industrial)	102,275,000	103,379,000	125,843,000	136,672,000
Farm Products (Raw Materials)	1,515,000	1,674,000	2,294,000	2,560,000
Farm Supplies	3,450,000	3,235,000	2,415,000	2,581,000
Tobacco	43,914,000	45,198,000	45,817,000	50,895,000
Furniture and House Furnishings	27,033,000	32,058,000	30,703,000	35,677,000
Groceries and Meats	322,153,000	347,755,000	377,378,000	410,400,000
Hardware	40,613,000	41,317,000	42,982,000	46,079,000
Building Materials (Excluding lumber)	33,674,000	37,312,000	44,190,000	51,202,000
Lumber and Millwork	41,301,000	40,376,000	52,893,000	55,188,000
Machinery, Equipment and Supplies (Commercial and Construction)	24,270,000	24,443,000	29,236,000	33,256,000
Machinery and Equipment (Farm)	92,385,000	93,456,000	76,177,000	78,692,000
Machinery, Equipment and Supplies (Industrial)	37,487,000	46,538,000	48,483,000	56,144,000
Professional Services, Transportation Equipment and Supplies	20,100,000	22,896,000	27,425,000	31,339,000
Metals and Metal Work	28,256,000	30,280,000	32,013,000	39,253,000
Paper and Paper Products	17,261,000	18,822,000	20,271,000	21,553,000
Petroleum and Petroleum Products	210,182,000	212,853,000	204,437,000	246,329,000
Plumbing and Heating Equipment and Supplies	47,005,000	52,711,000	57,383,000	63,149,000
Miscellaneous	12,656,000	14,350,000	15,329,000	17,533,000
TOTAL	1,210,432,000	1,282,882,000	1,368,511,000	1,525,101,000

	1966	1967	1968	1969
By Locations:				
Calgary	408,397,000	433,200,000	469,977,000	517,920,000
Edmonton	462,486,000	503,512,000	556,233,000	603,067,000
Lethbridge	31,469,000	34,728,000	36,563,000	40,382,000
Medicine Hat	11,192,000	10,398,000	11,549,000	11,771,000
Red Deer	14,411,000	16,114,000	17,839,000	19,450,000
Smaller Centres	30,028,000	31,238,000	36,871,000	39,579,000
No Area Breakdown	252,449,000	253,692,000	239,479,000	292,932,000
TOTAL	1,210,432,000	1,282,882,000	1,368,511,000	1,525,101,000

Source: Alberta Department of Industry and Tourism, **op. cit.**

TABLE A-22

RETAIL TRADE, ALBERTA, 1964 - 1969

(thousands of dollars)

	1964	1965	1966	1967	1968	1969
Total Retail Trade	1,502,750	1,598,752	1,735,762	1,885,655	2,028,022	2,198,718
Grocery and Combination Stores	283,298	301,662	331,668	343,829	363,256	396,620
Other Food and Beverage Stores	31,896	32,508	37,536	37,049	39,847	46,199
General Merchandise Stores	—	—	—	59,200	64,084	70,094
General Stores	70,869	72,709	76,380	91,595	98,236	105,560
Department Stores	196,614	205,669	224,352	236,338	270,253	299,633
Variety Stores	28,077	36,543	43,949	30,056	20,799	22,816
Motor Vehicle Dealers	309,454	340,513	364,509	378,242	413,219	434,897
Garages and Filling Stations	146,232	153,777	158,147	177,854	195,107	212,004
Men's Clothing Stores	20,240	22,049	23,182	24,395	24,731	26,112
Family Clothing Stores	17,287	17,291	17,651	19,603	20,887	21,329
Women's Clothing Stores	22,470	23,882	28,757	29,877	32,322	34,894
Shoe Stores	13,015	13,840	13,724	16,665	18,907	21,039
Hardware Stores	29,929	30,968	33,982	36,448	39,094	41,299
Furniture, Appliance and Radio Stores	42,028	40,549	45,270	48,057	51,446	52,547
Fuel Oil Dealers	9,229	8,850	9,975	8,430	8,843	9,248
Drug Stores	40,476	46,517	48,966	58,012	62,857	65,364
Jewellery Stores	14,722	15,921	17,622	20,034	21,074	22,170
Miscellaneous	226,864	235,504	260,092	269,970	283,064	316,893

Source: Alberta Department of Industry and Tourism, **op. cit.**

TABLE A-23

RETAIL TRADE BY SELECTED BUSINESS GROUPS, BY REGION AND PROVINCE, 1966

(millions of dollars)

		Total All Stores		Food Group		General Merchandise	
	Population	Sales	Per Cent of Total Sales	Sales	Per Cent of Total Sales	Sales	Per Cent Of Total Sales
Southern Region[1]	151,169	178.6	10.1	38.5	10.6	27.5	7.3
Central Region[2]	245,167	265.1	15.1	47.2	13.2	44.6	11.7
Northern Region[3]	183,121	166.3	9.5	31.3	8.7	39.2	10.3
Mountain Region[4]	38,553	47.1	2.7	12.3	3.4	4.7	1.2
Edmonton Region[5]	476,053	608.6	34.6	128.0	35.6	139.4	36.6
Calgary Region[6]	369,140	492.4	28.0	102.3	28.5	125.3	32.9
Provincial Total	1,463,203	1,758.1	100.0	359.3	100.0	380.8	100.0

	Automotive		Apparel and Accessories		Hardware and Home Furnishings		Other Retail Stores	
	Sales	Per Cent of Total Sales	Sales	Per Cent of Total Sales	Sales	Per Cent of Total Sales	Sales	Per Cent Of Total Sales
Southern Region[1]	64.2	10.7	12.5	12.7	13.7	14.0	22.4	10.2
Central Region[2]	114.4	19.1	14.6	14.9	17.5	18.1	26.7	12.0
Northern Region[3]	61.6	10.2	7.7	7.9	8.9	9.2	17.7	7.9
Mountain Region[4]	16.0	2.6	2.8	2.8	2.8	2.8	8.5	3.9
Edmonton Region[5]	198.7	33.1	33.8	34.5	30.0	30.8	78.7	35.6
Calgary Region[6]	146.4	24.3	26.7	27.2	24.5	25.1	67.1	30.4
Provincial Total	601.3	100.0	98.1	100.0	97.4	100.0	221.1	100.0

[1] Southern Region includes Census Divisions 1, 2 and 3.

[2] Central Region includes Census Divisions 4, 5, 7, 8 and 10.

[3] Northern Region includes Census Divisions 12, 13 and 15.

[4] Mountain Region includes Census Divisions 9 and 14.

[5] Edmonton Region includes Census Division 11.

[6] Calgary Region includes Census Division 6.

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-24

COMMUNITY, BUSINESS, AND PERSONAL SERVICES, SELECTED SECTORS, BY REGION AND PROVINCE, 1966

(millions of dollars)

		Total							
	Population	Receipts	Per Cent of Alberta Total	Amusement and Recreation	Business and Services	Personal Services	Repair Services	Hotels, Tourist Camps and Restaurants	Miscel-laneous
Southern Region[1]	151,169	23.8	6.8	1.8	1.1	3.2	0.7	15.5	1.2
Central Region[2]	245,167	35.8	10.1	2.5	0.9	3.1	1.4	25.5	2.1
Northern Region[3]	183,121	29.6	8.4	1.4	0.4	2.2	1.2	23.0	1.1
Mountain Region[4]	38,553	25.6	7.3	1.3	*	1.1	*	22.5	*
Edmonton Region[5]	476,053	123.7	35.2	9.4	13.4	17.3	2.1	60.3	21.2
Calgary Region[6]	369,140	113.0	32.2	12.2	14.0	15.5	1.5	51.0	18.9
PROVINCIAL TOTAL	1,463,203	351.5	100.0	28.6	29.8	42.4	6.9	197.8	44.5

* Figures withheld.

[1] Southern Region includes Census Divisions 1, 2 and 3.

[2] Central Region includes Census Divisions 4, 5, 7, 8 and 10.

[3] Northern Region includes Census Divisions 12, 13 and 15.

[4] Mountain Region includes Census Divisions 9 and 14.

[5] Edmonton Region includes Census Division 11.

[6] Calgary Region includes Census Division 6.

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-25

VISITORS TO NATIONAL PARKS IN ALBERTA, 1964 - 1969

(Number)

	1964	1965	1966	1967	1968	1969
Banff	1,592,140	1,705,010	1,966,365	2,038,328	2,136,832	2,239,016
Elk Island	176,433	195,947	206,658	224,139	279,451	302,833
Jasper	444,406	481,456	551,803	605,271	789,239	1,056,997
Waterton Lakes	371,258	393,425	487,589	503,729	516,112	472,850
TOTAL	2,584,237	2,775,838	3,212,415	3,371,467	3,721,634	4,071,696

Source: Alberta Department of Industry and Tourism, **op. cit.**

TABLE A-26

PUBLIC AND PRIVATE INVESTMENT, ALBERTA, 1948 - 1969

(millions of dollars)

	Primary Industries and Construction	Manufacturing	Utilities	Trade Finance and Commercial Services	Housing	Institutional Services and Government Departments	Total Capital and Repair Expenditures		Total
							Construction	Machinery and Equipment	
1948	*	23.4	61.8	*	65.6	74.3	+	+	390.1
1949	164.8	20.6	79.2	25.9	91.1	88.0	280.5	189.1	469.6
1950	192.5	24.4	86.9	41.4	85.8	90.2	312.2	209.0	521.2
1951	234.1	45.1	97.1	54.7	77.9	125.9	379.1	255.7	634.8
1952	272.8	86.4	125.1	55.1	87.0	134.8	454.7	306.5	761.2
1953	269.0	104.1	130.0	72.1	123.0	198.9	569.5	327.6	897.1
1954	238.0	64.0	144.3	60.9	140.2	159.7	530.4	276.7	807.1
1955	308.2	78.0	143.6	59.9	140.1	188.3	636.0	282.1	918.1
1956	380.2	130.9	186.6	54.4	155.6	207.9	725.6	390.0	1,115.6
1957	336.0	82.7	210.3	64.6	154.0	223.1	707.2	363.5	1,070.7
1958	321.3	90.5	204.5	75.1	218.6	218.3	786.7	341.6	1,128.3
1959	381.5	100.1	190.5	83.5	216.8	244.2	818.7	397.9	1,216.6
1960	393.4	84.3	219.4	91.2	177.4	254.9	815.5	405.1	1,220.6
1961	443.8	56.9	242.6	79.5	195.3	251.8	876.6	393.3	1,269.9
1962	383.1	72.7	184.8	83.3	229.5	282.7	820.1	416.0	1,236.1
1963	462.1	64.8	216.7	101.2	221.8	243.6	862.0	448.2	1,310.2
1964	518.3	83.2	239.3	110.6	214.2	256.0	920.0	501.6	1,421.6
1965	644.1	105.6	283.4	119.2	215.2	296.8	1,093.5	570.8	1,664.3
1966	734.1	103.3	360.3	129.6	209.7	407.3	1,276.5	667.8	1,944.3
1967	746.7	113.4	393.6	149.2	244.6	446.6	1,347.9	746.2	2,094.1
1968	742.0	139.2	422.5	147.7	326.6	386.7	1,465.5	699.2	2,164.7
1969	835.9	135.1	472.6	193.6	358.4	438.7	1,612.0	822.3	2,434.3

* Figures included in total.

+ Figures not available.

Source: Alberta Bureau of Statistics, **op. cit.**

TABLE A-27

PUBLIC AND PRIVATE INVESTMENTS, ALBERTA, 1968 AND 1969

(millions of dollars)

		Capital and Repair Expenditures		
		Construction	Machinery and Equipment	Total
1. Primary Industries and Construction Industry	1968	418.1	323.9	742.0
	1969	476.9	359.0	835.9
Manufacturing:				
2. Food and Beverages	1968	5.4	13.9	19.3
	1969	7.0	15.2	22.2
3. Wood	1968	1.9	6.0	7.9
	1969	1.4	5.4	6.8
4. Metal Fabricating	1968	0.5	2.7	3.2
	1969	0.8	3.6	4.4
5. Non-Metallic	1968	1.4	7.4	8.8
	1969	4.3	9.8	14.1
6. Other Manufacturing	1968	56.5	43.5	100.0
	1969	29.8	57.8	87.6
7. Sub-totals (2 to 7)	1968	65.7	73.5	139.2
	1969	43.3	91.8	135.1
8. Utilities	1968	248.8	173.7	422.5
	1969	254.6	218.0	472.6
9. Trade, Finance and Commercial Services	1968	75.4	72.3	147.7
	1969	99.8	93.8	193.6
10. Housing	1968	326.6	—	326.6
	1969	358.4	—	358.4
11. Institutional Services and Government Departments	1968	330.9	55.8	386.7
	1969	379.0	59.7	438.7
TOTALS	1968	1,465.5	699.2	2,164.7
	1969	1,612.0	822.3	2,434.3

Source: Alberta Department of Industry and Tourism, **op. cit.**

APPENDIX B

REAL GROWTH IN ALBERTA PERSONAL INCOME

Alberta personal income data in current dollars from 1950 to 1969 were obtained from the Alberta Bureau of Statistics and converted to constant dollars through the use of the 1957 price index series (see Appendix C).

From the constant dollar series, a real rate of growth per annum for the period 1950-1969 was calculated by use of the following equation:

$$PY_{1969} = PY_{1950} (1 + r)^{19} ,$$

where PY = personal income in millions

19 = the time interval in years

r = annual rate of growth expressed as a decimal.

This is, in effect, a modification of the equation commonly used to calculate interest accumulation when compounded every period.

The calculations are

$$\$3,396 = \$1,209 (1 + r)^{19}$$

$$\frac{\$3,396}{\$1,209} = (1 + r)^{19}$$

This may be expressed in logarithmic form as

$$\log \frac{(3,396)}{(1,209)} = 19 \times \log (1 + r)$$

$$\log 2.8089 = 19 \times \log (1 + r)$$

$$.44855 = 19 \times \log (1 + r)$$

$$\frac{.44855}{19} = \log (1 + r)$$

$$.023608 = \log (1 + r)$$

$$\text{antilog } .023608 = 1 + r$$

$$1.056 = 1 + r$$

$$r = .056$$

Thus, the real annual growth rate based on these data was equal to about 5.6 per cent a year from 1950 to 1969.

APPENDIX C

CALCULATION OF PRICE INDEXES

The price index in the last column was then used to convert Alberta Gross Provincial Product and personal income data in current dollars to 1957 constant dollars.

The assumption of a price inflator of 2.5 percentage points beyond 1969 on an annual basis is arbitrary. It is hoped that it will convey a sense of changing dollar values without dealing in numbers that are beyond the imagination of the reader.

Current and constant (1957) dollar Gross National Product data for 1950-1969 were obtained from the Dominion Bureau of Statistics.[1]

The price index for each of the years in the 1950 - 1969 interval is equal to the ratio:

$$\frac{\text{Current dollar GNP}}{\text{Constant (1957) dollar GNP}}$$

	GNP, Millions		
Year	Current Dollars	Constant Dollars	Price Index 1957 = 100
1950	18,006	23,415	76.9
1951	21,170	24,877	85.1
1952	23,995	26,840	89.4
1953	25,020	27,862	89.8
1954	24,871	27,063	91.9
1955	27,070	28,952	93.5
1956	30,182	31,033	97.1
1957	31,909	31,909	100.0
1958	32,984	32,281	101.9
1959	34,784	33,286	104.5
1960	35,928	33,894	106.0
1961	37,471	35,718	106.7
1962	40,575	37,431	108.4
1963	43,424	39,369	110.3
1964	47,393	41,867	113.2
1965	52,203	44,771	116.6
1966	58,120	47,678	121.9
1967	62,068	48,988	126.7
1968	71,454	54,965	130.0
1969	78,099	58,203	134.0

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[1] Dominion Bureau of Statistics, **Canadian Statistical Review**, various months, **1969 and 1970**.

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